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TESTING
CNAS L0446

GRGTEST

Page 1 of 93

Test Report

Verified code: 748166

Report No.: E20230331478001-6

Customer: Lumi United Technology Co., Ltd

Address: Room 801-804, Building 1, Chongwen Park, Nanshan iPark, No. 3370, Liuxian Avenue, Fuguang Community, Taoyuan Residential District, Nanshan District, Shenzhen, China

Sample Name: Hub M3

Sample Model: HM-G01E

Receive Sample Date: Aug.02,2023

Test Date: Nov.20,2023 ~ Dec.04,2023

Reference Document: ETSI EN301 893 V2.1.1 (2017-05)

Test Result: Pass

Prepared by: Chen Xiaocong
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Reviewed by: Jiang Tao
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Approved by: Xiao Liang
Xiao Liang

GRG METROLOGY & TEST GROUP CO., LTD.

Issued Date: 2023-12-29

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5. Without the agreement of the laboratory, the client is not authorized to use the test results for unapproved propaganda.

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TABLE OF CONTENTS

1. TEST RESULT SUMMARY	6
2. GENERAL DESCRIPTION OF EUT	7
2.1 APPLICANT.....	7
2.2 MANUFACTURER.....	7
2.3 BASIC DESCRIPTION OF EUT.....	7
2.4 TEST CONFIGURATION.....	10
2.5 TEST MODE.....	11
2.6 LOCAL SUPPORTIVE INSTRUMENTS.....	11
2.7 CONFIGURATION OF SYSTEM UNDER TEST.....	11
3. LABORATORY AND ACCREDITATIONS.....	13
3.1 LABORATORY	13
3.2 ACCREDITATIONS	13
3.3 MEASUREMENT UNCERTAINTY	14
3.4 LIST OF USED TEST EQUIPMENT	15
4. RADIO TECHNICAL REQUIREMENTS SPECIFICATION IN EN 301893.....	17
4.1 NOMINAL CENTRE FREQUENCIES	17
4.1.1 LIMITS	17
4.1.2 TEST PROCEDURE	17
4.1.3 TEST SETUP.....	17
4.1.4 TEST RESULTS.....	18
4.2 NOMINAL CHANNEL BANDWIDTH AND OCCUPIED CHANNEL BANDWIDTH	20
4.2.1 LIMITS	20
4.2.2 TEST PROCEDURE	20
4.2.3 TEST SETUP.....	20
4.2.4 TEST RESULTS.....	21
4.3 RF OUTPUT POWER AND TRANSMIT POWER CONTROL(TPC).....	25
4.3.1 LIMITS	25
4.3.2 TEST PROCEDURE	25
4.3.3 TEST SETUP.....	25
4.3.4 TEST RESULTS.....	26
4.4 POWER DENSITY	28
4.4.1 LIMITS	28
4.4.2 TEST PROCEDURE	28
4.4.3 TEST SETUP.....	28
4.4.4 TEST RESULTS.....	29
4.5 TRANSMITTER UNWANTED EMISSIONS OUTSIDE 5GHZ BANDS	36
4.5.1 LIMITS	36
4.5.2 TEST PROCEDURE	36
4.5.3 TEST SETUP.....	37
4.5.4 DATA SAMPLE.....	38
4.5.5 TEST RESULTS.....	39
4.6 TRANSMITTER UNWANTED EMISSIONS WITHIN 5GHZ BANDS.....	65
4.6.1 LIMITS	65
4.6.2 TEST PROCEDURE	65
4.6.3 TEST SETUP.....	65
4.6.4 TEST RESULTS.....	66
4.7 ADAPTIVITY.....	77
4.7.1 DEFINITION	77
4.7.2 TEST PROCEDURE	77
4.7.3 TEST SETUP.....	77
4.7.4 TEST RESULTS.....	78

5. RECEIVER REQUIREMENTS	84
5.1 RECEIVER SPURIOUS EMISSIONS	84
5.1.1 LIMITS	84
5.1.2 TEST PROCEDURE	84
5.1.3 TEST SETUP.....	85
5.1.4 DATA SAMPLE.....	86
5.1.5 TEST RESULTS.....	87
5.2 RECEIVER BLOCKING.....	90
5.2.1 LIMITS	90
5.2.2 TEST PROCEDURE	90
5.2.3 TEST SETUP.....	91
5.2.4 TEST RESULTS.....	91
APPENDIX A: PHOTOGRAPH OF THE TEST ARRANGEMENT	93
APPENDIX B: PHOTOGRAPH OF THE EUT.....	93

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REPORT ISSUED HISTORY

Report Version	Report No.	Description	Compile Date
1.0	E20230331478001-6	Original Issue	2023-12-18

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1. TEST RESULT SUMMARY

Transmitter Part				
Standard	Item	Standard Clause	Limit	Result
ETSI EN 301 893 V2.1.1 (2017-05)	Nominal Centre frequencies	4.2.1	± 20 ppm	Pass
	Nominal Channel Bandwidth and Occupied Channel Bandwidth	4.2.2	Clause 4.2.2.2	Pass
	RF output power, Transmit Power Control (TPC) and Power Density	4.2.3	Clause 4.2.3.2	Pass
	Transmitter unwanted emissions outside the 5 GHz RLAN bands	4.2.4.1	EN 301 893 Table 4	Pass
	Transmitter unwanted emissions within the 5 GHz RLAN bands	4.2.4.2	Clause 4.2.4.2.2	Pass
	Dynamic Frequency Selection (DFS)	4.2.6	Clause 4.2.6.2	N/A
	Adaptivity (Channel Access Mechanism)	4.2.7	Clause 4.2.7.3	Pass

Note: N/A is not applied. The EUT has no DFS function.

Receiver Part				
Standard	Item	Standard Clause	Limit	Result
ETSI EN 301 893 V2.1.1 (2017-05)	Receiver spurious emissions	4.2.5	EN 301 893 Table 5	Pass
	Receiver Blocking	4.2.8	EN 301 893 Table 9	Pass

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2. GENERAL DESCRIPTION OF EUT

2.1 APPLICANT

Name: Lumi United Technology Co., Ltd
Address: Room 801-804, Building 1, Chongwen Park, Nanshan iPark, No. 3370, Liuxian Avenue, Fuguang Community, Taoyuan Residential District, Nanshan District, Shenzhen, China

2.2 MANUFACTURER

Name: Lumi United Technology Co., Ltd
Address: Room 801-804, Building 1, Chongwen Park, Nanshan iPark, No. 3370, Liuxian Avenue, Fuguang Community, Taoyuan Residential District, Nanshan District, Shenzhen, China

2.3 BASIC DESCRIPTION OF EUT

Equipment: Hub M3
Model No.: HM-G01E
Adding Model: HM-G01D
Models Difference: The model NO. HM-G01E & HM-G01D have the same technical construction including circuit diagram, PCB LAYOUT, hardware version and software version identical, except sales area and packaging are different.
Trade Name: Aqara
Power Supply: DC 5V/2A or PoE input 48V/0.27A
Antenna Specification: PIFA antenna with 0.5dBi gain (Max)
Frequency Band: 5180MHz-5240MHz for IEEE 802.11a/ n HT20/ac VHT20
5190MHz-5230MHz for IEEE 802.11n HT40/ac VHT40
5210MHz for IEEE 802.11ac VHT80
Modulation Type: IEEE 802.11a: OFDM
IEEE 802.11n: OFDM
IEEE 802.11ac: OFDM
TPC Function: Not support
Temperature Range: -10 °C ~ +50 °C
Hardware Version: V2.0.5_1060
Software Version: T0
Sample submitting way: ■Provided by customer Sampling
Sample No: E20230331478001-0001, E20230331478001-0003, E20230331478001-0004
Note 1: The EUT antenna gain is provided by the applicant. This report is made solely on the basis of such data and/or information. We accept no responsibility for the authenticity and completeness of the above data and information and the validity of the results and/or conclusions.
Note 2: All the tests were performed on the model HM-G01E.

Channel List

Mode	Channel	Frequency (MHz)	Mode	Channel	Frequency (MHz)	Mode	Channel	Frequency (MHz)
IEEE 802.11a	36	5180	IEEE 802.11n HT20	36	5180	IEEE 802.11ac VHT20	36	5180
	40	5200		40	5200		40	5200
	44	5220		44	5220		44	5220
	48	5240		48	5240		48	5240

Mode	Channel	Frequency (MHz)	Mode	Channel	Frequency (MHz)	Mode	Channel	Frequency (MHz)
IEEE 802.11n HT40	38	5190	IEEE 802.11ac VHT40	38	5190	IEEE 802.11ac VHT80	42	5210
	46	5230		46	5230			

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Adaptive Information

Adaptive equipment	
<input type="checkbox"/>	Frame Based Equipment
	<input type="checkbox"/> The Frame Based Equipment operates as an Initiating Device
	<input type="checkbox"/> The Frame Based Equipment operates as an Responding Device
	<input type="checkbox"/> The Frame Based Equipment can operate as an Initiating Device and as a Responding Device
<input checked="" type="checkbox"/>	Load Based Equipment
	<input type="checkbox"/> The Load Based Equipment operates as a Supervising Device
	<input checked="" type="checkbox"/> The Load Based Equipment operates as a Supervised Device
	<input type="checkbox"/> The Load Based Equipment can operate as a Supervising and as a Supervised Device
	<input type="checkbox"/> The Load Based Equipment makes use of note 1 in table 7 or note 1 in table 8 of ETSI EN 301 893V2.1.1
	<input type="checkbox"/> The Load Based Equipment , when operating as a Supervising Device, makes use of note 2 in table 7 of ETSI EN 301 893 V2.1.1
	<input type="checkbox"/> The Load Based Equipment operates as an Initiating Device
	<input checked="" type="checkbox"/> The Load Based Equipment operates as an Responding Device
	<input type="checkbox"/> The Load Based Equipment can operate as an Initiating Device and as a Responding Device
With regard to Energy Detection Threshold, the Load Based Equipment has implemented either option 1 of clause 4.2.7.3.2.5 of ETSI EN 301 893 V2.1.1 or option 2 of clause 4.2.7.3.2.5 of ETSI EN 301 893 V2.1.1	
<input type="checkbox"/>	Option 1
	<input type="checkbox"/> Priority Class 1
	<input type="checkbox"/> Priority Class 2
	<input type="checkbox"/> Priority Class 3
	<input type="checkbox"/> Priority Class 4
<input checked="" type="checkbox"/>	Option 2
	<input checked="" type="checkbox"/> Manufacturer Declaration(Note 1)

Note1:

Manufacturer Declaration

Test Item	Standard Clause	ETSI EN 301 893 V2.1.1 information	Manufacturer Declaration
Device Type	4.2.7.3.2.2	Initiating Device or Responding Device, or both & Supervising Device or Supervised Device, or both	Responding Device & Supervised Device
Multi channel Operation	4.2.7.3.2.3	Option 1 OR Option 2	Option 2

Priority Class	4.2.7.3.2.4	Priority Class 1 Priority Class 2 Priority Class 3 Priority Class 4	Priority Class 3
ED Threshold Level	4.2.7.3.2.5	Option 1 OR Option 2	Option 1
Channel Access Mechanism (Idle Periods)	5.4.9.3.2.4.1 & 5.4.9.3.2.4.2	Option A: Procedure to verify the Channel Access Mechanism OR Option B: Compliance by declaration for the Channel Access Mechanism	Option B
Maximum Channel Occupancy Time(s)	5.4.9.3.2.5.1 & 5.4.9.3.2.5.2	Option A: Procedure to verify the maximum Channel Occupancy Time(s) OR Option B: Compliance by declaration for the maximum Channel Occupancy Time(s)	Option B
Adaptivity	5.4.9.3.2.2 & 5.4.9.3.2.3 -option 2	Single channel-AWGN, OFDM & LTE OR Multi channel-AWGN	Single channel-AWGN, OFDM & LTE And Multi channel-AWGN

DFS Operation Mode Information

<input type="checkbox"/>	Master
<input type="checkbox"/>	Slave with radar detection
<input checked="" type="checkbox"/>	Slave without radar detection

2.4 TEST CONFIGURATION**Test EUT Rate**

Modulation Mode	Data Rate/Mcs	Test Data Rate (Worst Case)
IEEE 802.11a SISO	6-54Mbps	6Mbps
IEEE 802.11n HT20 SISO	MCS0-MCS7	MCS0
IEEE 802.11n HT40 SISO	MCS0-MCS7	MCS0
IEEE 802.11ac VHT20 SISO	MCS0-MCS9	MCS0
IEEE 802.11ac VHT40 SISO	MCS0-MCS9	MCS0
IEEE 802.11ac VHT80 SISO	MCS0-MCS9	MCS0

2.5 TEST MODE

Mode No.	Description of the modes
1	5GHz Wi-Fi fixed frequency transmitting
2	5GHz Wi-Fi receiving
3	5GHz Wi-Fi work as normally

2.6 LOCAL SUPPORTIVE INSTRUMENTS

Name of equipment	Manufacturer	Model	Serial number	Note
Notebook	LENOVO	TianYi 310-14ISK	MP18DLC6	/
Test board	/	/	/	/
Adapter	Jian Aohai	A70-050200U-EU1	/	/
PoE Adapter	UE	PoE35-54A	/	/

No.	Cable Type	Qty.	Shielded Type	Ferrite Core(Qty.)	Length
1	Serial cable	1	No	0	0.3m
2	USB-MINI cable	1	Yes	0	1.0m
3	USB-C cable	1	Yes	0	0.8m
4	RJ45 cable	1	No	0	1.5m

Note: ¹⁾The notebook is just used to produce fixed frequency transmitting.

2.7 CONFIGURATION OF SYSTEM UNDER TEST

For RF Output power & Power density & Nominal centre frequencies & Nominal channel bandwidth and occupied channel bandwidth & Transmitter unwanted emissions within 5GHz bands & Receiver blocking



For Transmitter unwanted emissions outside 5GHz bands& Receiver spurious emissions



Test software:

Software version	Test level
QCOM_1.0	IEEE 802.11a: 66 IEEE 802.11n HT20: 62 IEEE 802.11n HT40: 58 IEEE 802.11ac VHT20: 62 IEEE 802.11ac VHT40: 58 IEEE 802.11ac VHT80: 58

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3. LABORATORY AND ACCREDITATIONS

3.1 LABORATORY

The tests & measurements refer to this report were performed by Shenzhen EMC Laboratory of GRG METROLOGY & TEST GROUP CO., LTD.

Add : No.1301 Guanguang Road Xinlan Community, Guanlan Street, Longhua District
Shenzhen, 518110, People's Republic of China

P.C. : 518110

Tel : 0755-61180008

Fax : 0755-61180008

3.2 ACCREDITATIONS

Our laboratories are accredited and approved by the following approval agencies according to ISO/IEC 17025.

China	CNAS(L0446)
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Copies of granted accreditation certificates are available for downloading from our web site,
<http://www.grgtest.com>

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3.3 MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2:

Measurement	Uncertainty
RF frequency	6.0×10^{-6}
RF power conducted	0.78 dB
Occupied channel bandwidth	0.4 dB
Unwanted emission, conducted	0.68 dB
Humidity	6.0 %
Temperature	2.0°C

Measurement	Frequency	Uncertainty	
Radiated Emission	Horizontal	30MHz~200MHz	4.0dB
		200MHz~1000MHz	4.1dB
		1GHz~18GHz	4.9dB
		18GHz~26.5GHz	5.3dB
	Vertical	30MHz~200MHz	3.9dB
		200MHz~1000MHz	4.2dB
		1GHz~18GHz	5.0dB
		18GHz~26.5GHz	5.2dB

This uncertainty represents an expanded uncertainty expressed at approximately the 95%.

This uncertainty represents an expanded uncertainty factor of $k=2$.

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3.4 LIST OF USED TEST EQUIPMENT

Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
RF Output power &Power density& Nominal centre frequencies &Nominal channel bandwidth and occupied channel bandwidth &Transmitter unwanted emissions within 5GHz bands				
Automatic control unit	TONSCEND	JS0806-2	2018060317	2024-08-04
Programmable constant temperature and humidity test chamber	FC	FPHC-23AW-40	FD202306015	2024-09-10
Spectrum Analyzer	R&S	FSV30	104381	2024-10-13
BT/Wi-Fi System	tonscend	JS1120-3		
Transmitter unwanted emissions outside 5GHz bands& Receiver spurious emissions				
Bi-log Antenna	Schwarzbeck	VULB9163	01279	2024-03-05
Horn Antenna	Schwarzbeck	BBHA9120D	02499	2024-08-26
Horn Antenna	Schwarzbeck	BBHA9170	01143	2024-09-18
Amplifier	Tonscend	TAP037030	AP20E8060081	2024-04-16
Amplifier	Tonscend	TAP01018048	AP20E8060076	2024-04-16
Amplifier	Tonscend	TAP9E6343	AP20E806065	2024-04-16
Amplifier	tonscent	TAP184050	AP20E806070	2024-04-11
Spectrum Analyzer	KEYSIGHT	N9010A	MY55370330	2024-09-08
Spectrum Analyzer	R&S	FSV3044	101184	2024-08-11
Test S/W	tonscent	JS36-RSE/5.0.0.1		

Aaptivity				
Spectrum Analyzer	R&S	FSV30	104381	2024-10-13
Vector Signal Generator	Agilent	N5182A	MY5014870	2024-06-09
Adjustable attenuator	SHX	GKTS-2-99-18 -A7-B	20113001	2024-10-12
BT/Wi-Fi System	tonscend	JS1120-3		
Receiver blocking				
Signal Generator	R&S	SMA100A	1406.6000k03-1821 90-G2	2024-10-13
Wideband radio Communication Tester	R&S	CMW500	144611-nC	2024-04-16
BT/Wi-Fi System	tonscend	JS1120-3		

Note: The calibration interval of the above test instruments is 12 months.

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4. RADIO TECHNICAL REQUIREMENTS SPECIFICATION IN EN 301893

4.1 NOMINAL CENTRE FREQUENCIES

4.1.1 LIMITS

The actual centre frequency for any given channel declared by the manufacturer shall be maintained within the range $f_c \pm 20$ ppm

4.1.2 TEST PROCEDURE

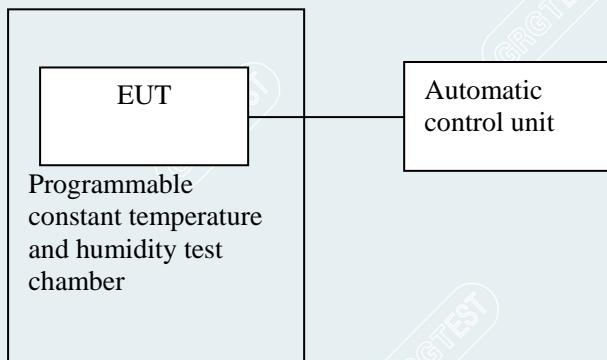
Test requirement: ETSI EN 301893 clause 4.2.1

Test Method: ETSI EN 301893 clause 5.4.2.2

EUT Operation: Keep EUT on transmitting mode by the software provided by manufacturer.
Pretest the EUT at different transmission rate and report show the worst case data.

Test condition: These measurements shall be performed under both normal and extreme test conditions (see clause 5.1).

4.1.3 TEST SETUP



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4.1.4 TEST RESULTS

Test environment: Normal condition: 25.4°C 45%RH/101.0kPa

Extreme test conditions: Minimum Temp: -10°C Test Voltage: DC 5V
Maximum Temp: +50°C

Test Engineer: Huang Tianmei

Test Date: 2023-11-20

Test Condition	Test Mode	Antenna	Frequency [MHz]	Result [ppm]	Limit [ppm]	Verdict
NTNV	IEEE 802.11a	Ant4	5180	-1.93050	±20	PASS
	IEEE 802.11n HT20	Ant4	5180	-1.15830	±20	PASS
	IEEE 802.11n HT40	Ant4	5190	-1.15607	±20	PASS
	IEEE 802.11ac VHT20	Ant4	5180	-0.77220	±20	PASS
	IEEE 802.11ac VHT40	Ant4	5190	-0.57804	±20	PASS
	IEEE 802.11ac VHT80	Ant4	5210	-0.19194	±20	PASS

Test Condition	Test Mode	Antenna	Frequency [MHz]	Result [ppm]	Limit [ppm]	Verdict
LTNV	IEEE 802.11a	Ant4	5180	-1.93050	±20	PASS
	IEEE 802.11n HT20	Ant4	5180	-1.15830	±20	PASS
	IEEE 802.11n HT40	Ant4	5190	-1.92678	±20	PASS
	IEEE 802.11ac VHT20	Ant4	5180	-0.77220	±20	PASS
	IEEE 802.11ac VHT40	Ant4	5190	-0.57804	±20	PASS
	IEEE 802.11ac VHT80	Ant4	5210	-1.15163	±20	PASS

Test Condition	Test Mode	Antenna	Frequency [MHz]	Result [ppm]	Limit [ppm]	Verdict
HTNV	IEEE 802.11a	Ant4	5180	-1.35135	± 20	PASS
	IEEE 802.11n HT20	Ant4	5180	-1.15830	± 20	PASS
	IEEE 802.11n HT40	Ant4	5190	-0.77071	± 20	PASS
	IEEE 802.11ac VHT20	Ant4	5180	-0.96525	± 20	PASS
	IEEE 802.11ac VHT40	Ant4	5190	-0.57804	± 20	PASS
	IEEE 802.11ac VHT80	Ant4	5210	0.57582	± 20	PASS

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4.2 NOMINAL CHANNEL BANDWIDTH AND OCCUPIED CHANNEL BANDWIDTH

4.2.1 LIMITS

The Nominal Channel Bandwidth for a single Operating Channel shall be 20 MHz.

Alternatively, equipment may implement a lower Nominal Channel Bandwidth with a minimum of 5 MHz, providing they still comply with the Nominal Centre Frequencies defined in clause 4.2.1 (20 MHz raster).

The Occupied Channel Bandwidth shall be between 80 % and 100 % of the Nominal Channel Bandwidth. In case of smart antenna systems (devices with multiple transmit chains) each of the transmit chains shall meet this requirement. The Occupied Channel Bandwidth might change with time/payload.

During a Channel Occupancy Time (COT), equipment may operate temporarily with an Occupied Channel Bandwidth of less than 80 % of its Nominal Channel Bandwidth with a minimum of 2 MHz.

4.2.2 TEST PROCEDURE

Test requirement: ETSI EN 301893 clause 4.2.2

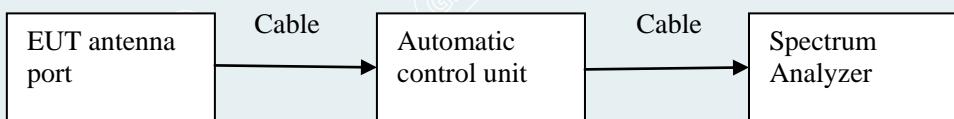
Test Method: ETSI EN 301893 clause 5.4.3.2

EUT Operation: Keep EUT on transmitting mode by the software provided by manufacturer.

Pretest the EUT at different transmission rate and report show the worst case data.

Test condition: These measurements shall be performed under normal test conditions (see clause 5.1.2).

4.2.3 TEST SETUP



----- The following blanks -----

4.2.4 TEST RESULTS

Test environment: Normal condition: 25.4°C 45%RH/101.0kPa

Test Engineer: Huang Tianmei

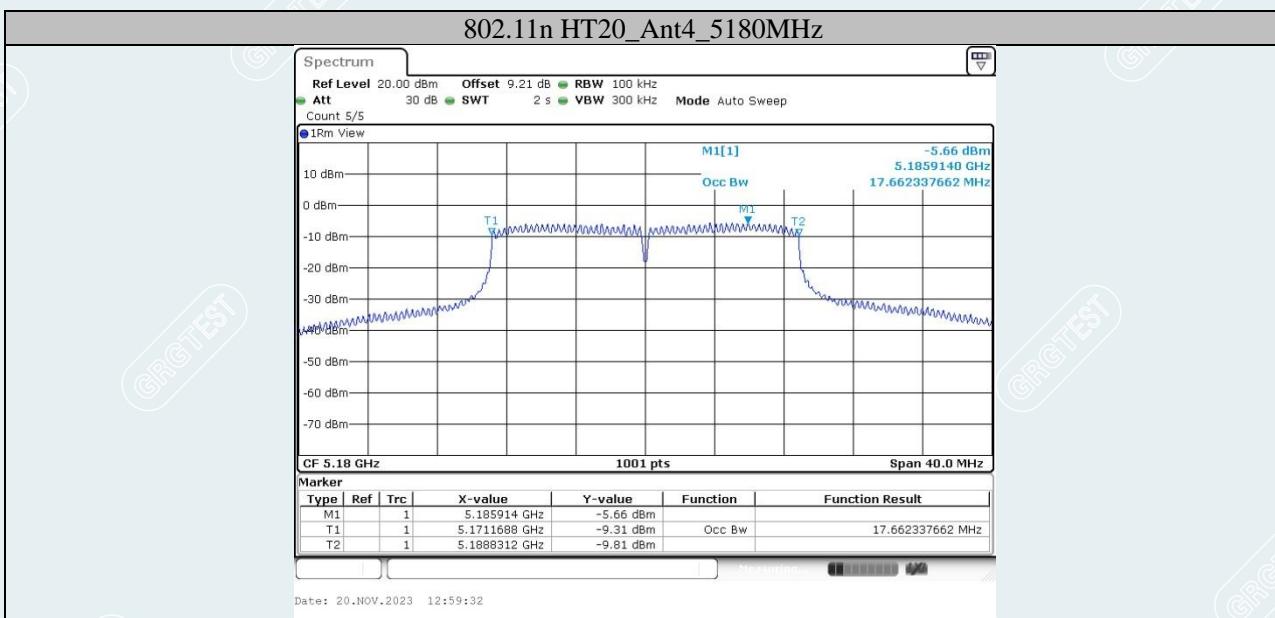
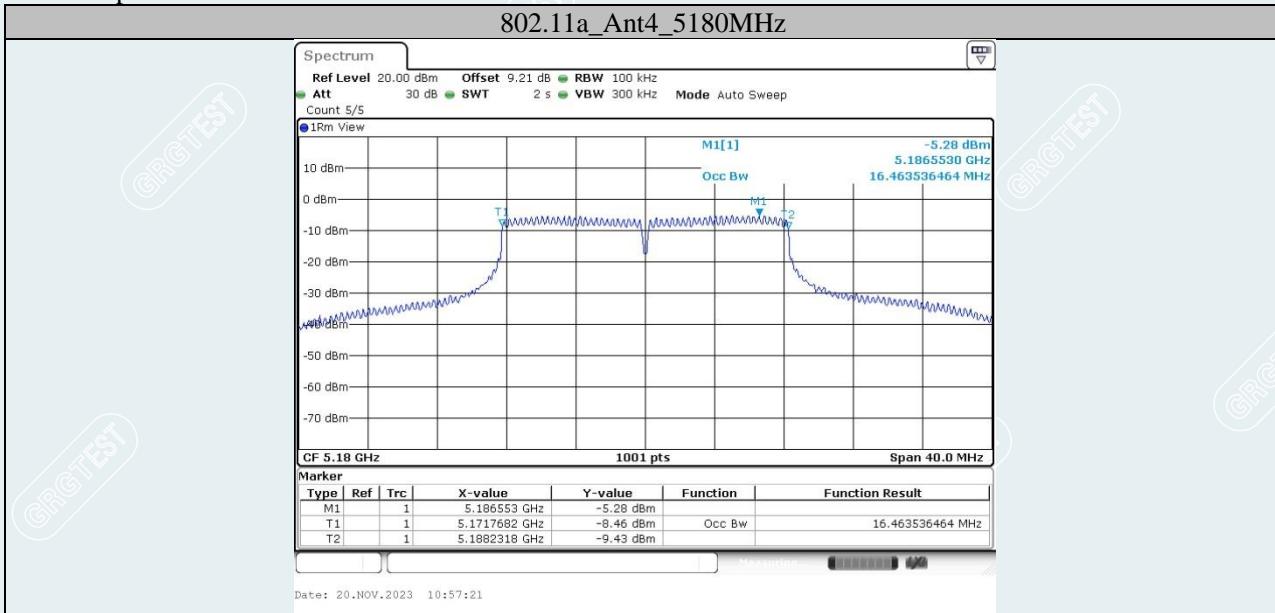
Test Date: 2023-11-20

Test Voltage: DC 5V

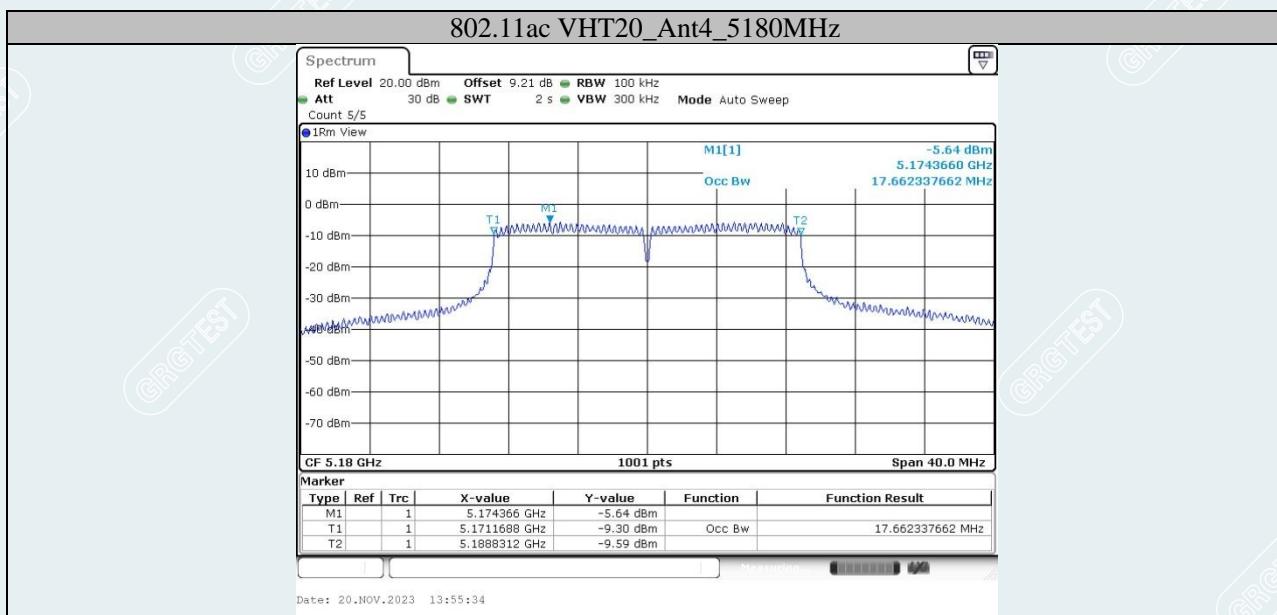
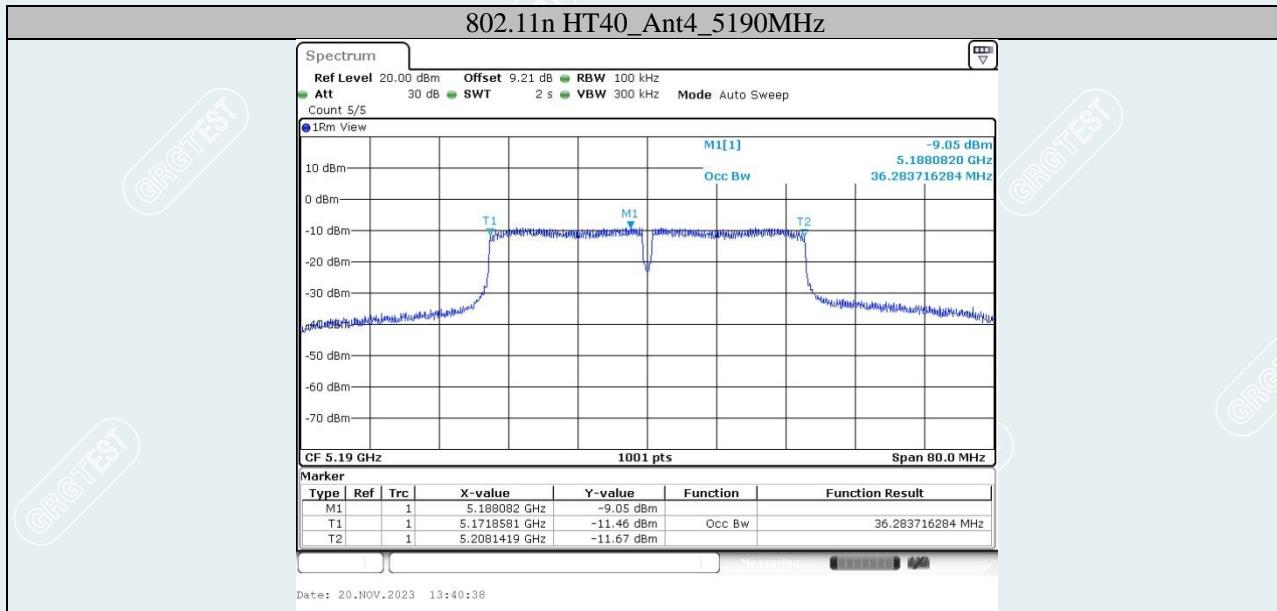
Test Mode	Antenna	Frequency [MHz]	OCB[MHz]	Limit[MHz]	Verdict
IEEE 802.11a	Ant4	5180	16.464	16 to 20	PASS
IEEE 802.11n HT20	Ant4	5180	17.662	16 to 20	PASS
IEEE 802.11n HT40	Ant4	5190	36.284	32 to 40	PASS
IEEE 802.11ac VHT20	Ant4	5180	17.662	16 to 20	PASS
IEEE 802.11ac VHT40	Ant4	5190	36.284	32 to 40	PASS
IEEE 802.11ac VHT80	Ant4	5210	75.924	64 to 80	PASS

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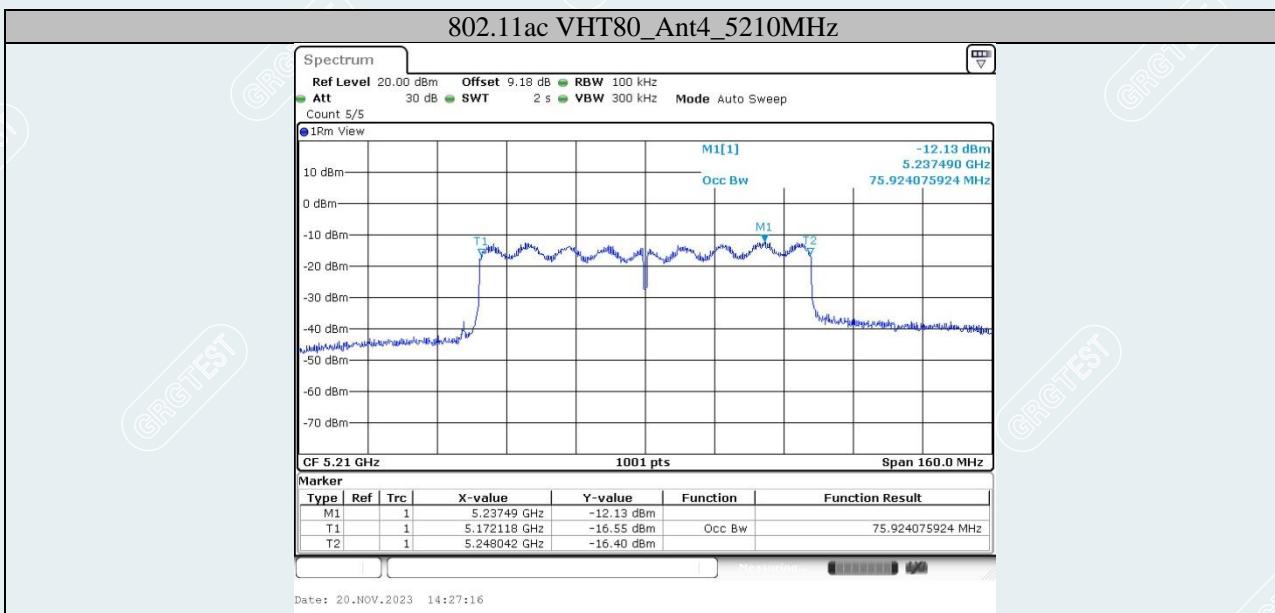
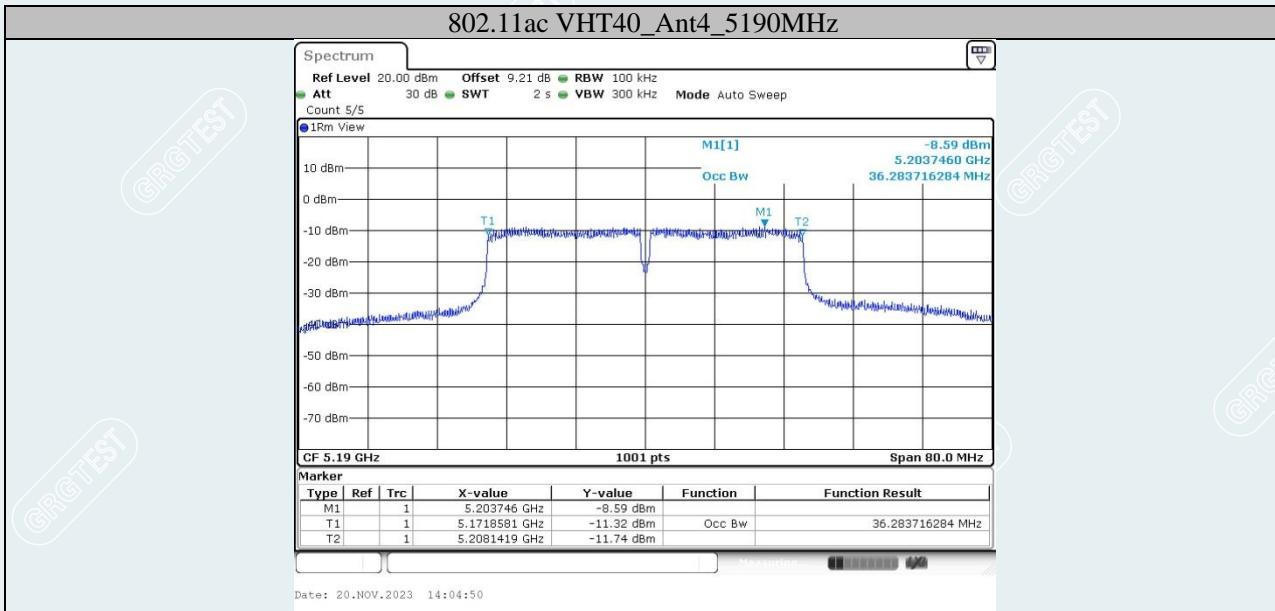
Test Graphs



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4.3 RF OUTPUT POWER AND TRANSMIT POWER CONTROL(TPC)

4.3.1 LIMITS

Table 2: Mean e.i.r.p. limits for RF output power and Power Density at the highest power level (P_H)

Frequency range (MHz)	Mean e.i.r.p. limit for P_H (dBm)		Mean e.i.r.p. density limit (dBm/MHz)	
	with TPC	without TPC	with TPC	without TPC
5 150 to 5 350	23	20/23 (see note 1)	10	7/10 (see note 2)
5 470 to 5 725	30 (see note 3)	27 (see note 3)	17 (see note 3)	14 (see note 3)

NOTE 1: The applicable limit is 20 dBm, except for transmissions whose nominal bandwidth falls completely within the band 5 150 MHz to 5 250 MHz, in which case the applicable limit is 23 dBm.

NOTE 2: The applicable limit is 7 dBm/MHz, except for transmissions whose nominal bandwidth falls completely within the band 5 150 MHz to 5 250 MHz, in which case the applicable limit is 10 dBm/MHz.

NOTE 3: Slave devices without a *Radar Interference Detection* function shall comply with the limits for the frequency range 5 250 MHz to 5 350 MHz.

Table 3: Mean e.i.r.p. limits for RF Output Power at the lowest power level of the TPC range

Frequency range	Mean e.i.r.p. (dBm) limit for P_L
5 250 MHz to 5 350 MHz	17
5 470 MHz to 5 725 MHz	24 (see note)
NOTE: Slave devices without a <i>Radar Interference Detection</i> function shall comply with the limits for the band 5 250 MHz to 5 350 MHz.	

4.3.2 TEST PROCEDURE

Test requirement: ETSI EN 301893 clause 4.2.3

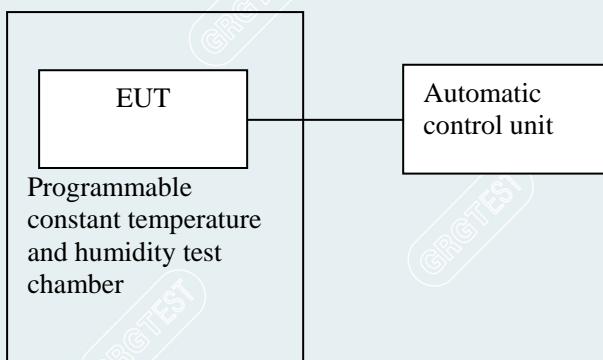
Test Method: ETSI EN 301893 clause 5.4.4.2

EUT Operation: Keep EUT on transmitting mode by the software provided by manufacturer.
Pretest the EUT at different transmission rate and report show the worst case data.

Test condition: These measurements shall be performed under both normal and extreme test conditions (see clause 5.1).

Note: This device not support TPC function.

4.3.3 TEST SETUP



4.3.4 TEST RESULTS

Test environment: Normal condition: 25.4°C 45%RH/101.0kPa

Extreme test conditions: Minimum Temp: -10°C Test Voltage: DC 5V
Maximum Temp: +50°C

Test Engineer: Huang Tianmei

Test Date: 2023-11-20

Test Condition	Test Mode	Antenna	Freq [MHz]	TPC	Conducted [dBm]	EIRP [dBm]	Limit [dBm]	Verdict
NTNV	IEEE 802.11a	Ant4	5180	NA	15.19	15.69	23	PASS
		Ant4	5240	NA	15.70	16.20	23	PASS
	IEEE 802.11n HT20	Ant4	5180	NA	14.55	15.05	23	PASS
		Ant4	5240	NA	15.02	15.52	23	PASS
	IEEE 802.11n HT40	Ant4	5190	NA	14.78	15.28	23	PASS
		Ant4	5230	NA	14.02	14.52	23	PASS
	IEEE 802.11ac VHT20	Ant4	5180	NA	14.48	14.98	23	PASS
		Ant4	5240	NA	15.09	15.59	23	PASS
	IEEE 802.11ac VHT40	Ant4	5190	NA	14.47	14.97	23	PASS
		Ant4	5230	NA	13.65	14.15	23	PASS
LTNV	IEEE 802.11ac VHT80	Ant4	5210	NA	13.79	14.29	23	PASS
	IEEE 802.11a	Ant4	5180	NA	15.29	15.79	23	PASS
		Ant4	5240	NA	15.79	16.29	23	PASS
	IEEE 802.11n HT20	Ant4	5180	NA	14.54	15.04	23	PASS
		Ant4	5240	NA	15.09	15.59	23	PASS

	IEEE 802.11n HT40	Ant4	5190	NA	14.80	15.30	23	PASS
		Ant4	5230	NA	14.02	14.52	23	PASS
	IEEE 802.11ac VHT20	Ant4	5180	NA	14.59	15.09	23	PASS
		Ant4	5240	NA	15.18	15.68	23	PASS
	IEEE 802.11ac VHT40	Ant4	5190	NA	14.54	15.04	23	PASS
		Ant4	5230	NA	13.66	14.16	23	PASS
HTNV	IEEE 802.11ac VHT80	Ant4	5210	NA	13.79	14.29	23	PASS
	IEEE 802.11a	Ant4	5180	NA	15.15	15.65	23	PASS

		Ant4	5240	NA	15.58	16.08	23	PASS
IEEE 802.11n HT20	Ant4	5180	NA	14.54	15.04	23	PASS	
	Ant4	5240	NA	15.00	15.50	23	PASS	
IEEE 802.11n HT40	Ant4	5190	NA	14.77	15.27	23	PASS	
	Ant4	5230	NA	13.98	14.48	23	PASS	
IEEE 802.11ac VHT20	Ant4	5180	NA	14.52	15.02	23	PASS	
	Ant4	5240	NA	15.05	15.55	23	PASS	
IEEE 802.11ac VHT40	Ant4	5190	NA	14.45	14.95	23	PASS	
	Ant4	5230	NA	13.68	14.18	23	PASS	
IEEE 802.11ac VHT80	Ant4	5210	NA	13.80	14.30	23	PASS	

----- The following blanks -----

4.4 POWER DENSITY

4.4.1 LIMITS

Table 2: Mean e.i.r.p. limits for RF output power and Power Density at the highest power level (P_H)

Frequency range (MHz)	Mean e.i.r.p. limit for P_H (dBm)		Mean e.i.r.p. density limit (dBm/MHz)	
	with TPC	without TPC	with TPC	without TPC
5 150 to 5 350	23	20/23 (see note 1)	10	7/10 (see note 2)
5 470 to 5 725	30 (see note 3)	27 (see note 3)	17 (see note 3)	14 (see note 3)

NOTE 1: The applicable limit is 20 dBm, except for transmissions whose nominal bandwidth falls completely within the band 5 150 MHz to 5 250 MHz, in which case the applicable limit is 23 dBm.

NOTE 2: The applicable limit is 7 dBm/MHz, except for transmissions whose nominal bandwidth falls completely within the band 5 150 MHz to 5 250 MHz, in which case the applicable limit is 10 dBm/MHz.

NOTE 3: Slave devices without a *Radar Interference Detection* function shall comply with the limits for the frequency range 5 250 MHz to 5 350 MHz.

4.4.2 TEST PROCEDURE

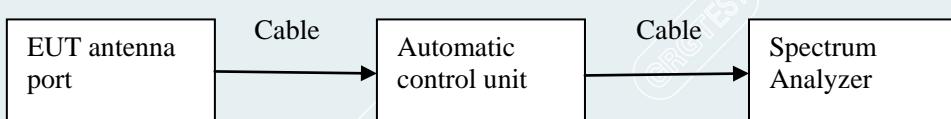
Test requirement: ETSI EN 301893 clause 4.2.3

Test Method: ETSI EN 301893 clause 5.4.4.2

EUT Operation: Keep EUT on transmitting mode by the software provided by manufacturer.
Pretest the EUT at different transmission rate and report show the worst case data.

Test condition: These measurements shall be performed under normal test conditions (see clause 5.1.2).

4.4.3 TEST SETUP



----- The following blanks -----

4.4.4 TEST RESULTS

Test environment: Normal condition: 25.4°C 45%RH/101.0kPa

Test Engineer: Huang Tianmei

Test Date: 2023-11-20

Test Voltage: DC 5V

Test Mode	Antenna	Freq[MHz]	PSD [dBm/MHz]	Limit [dBm/MHz]	Verdict
IEEE 802.11a	Ant4	5180	4.37	10	PASS
	Ant4	5240	4.72	10	PASS
IEEE 802.11n HT20	Ant4	5180	3.73	10	PASS
	Ant4	5240	4.12	10	PASS
IEEE 802.11ac VHT20	Ant4	5180	3.37	10	PASS
	Ant4	5240	4.09	10	PASS

----- The following blanks -----

Test Graphs













4.5 TRANSMITTER UNWANTED EMISSIONS OUTSIDE 5GHZ BANDS

4.5.1 LIMITS

Table 4: Transmitter unwanted emission limits outside the 5 GHz RLAN bands

Frequency range	Maximum power	Bandwidth
30 MHz to 47 MHz	-36 dBm	100 kHz
47 MHz to 74 MHz	-54 dBm	100 kHz
74 MHz to 87,5 MHz	-36 dBm	100 kHz
87,5 MHz to 118 MHz	-54 dBm	100 kHz
118 MHz to 174 MHz	-36 dBm	100 kHz
174 MHz to 230 MHz	-54 dBm	100 kHz
230 MHz to 470 MHz	-36 dBm	100 kHz
470 MHz to 862 MHz	-54 dBm	100 kHz
862 MHz to 1 GHz	-36 dBm	100 kHz
1 GHz to 5,15 GHz	-30 dBm	1 MHz
5,35 GHz to 5,47 GHz	-30 dBm	1 MHz
5,725 GHz to 26 GHz	-30 dBm	1 MHz

4.5.2 TEST PROCEDURE

Test requirement: ETSI EN 301 893 clause 4.2.4.1

Test Method: ETSI EN 301 893 clause 5.4.5.2 and annex B

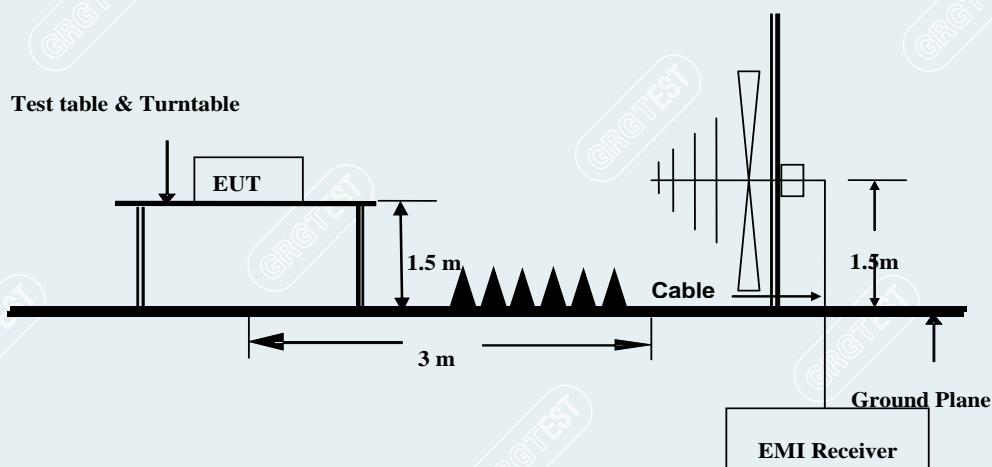
EUT Operation: Keep EUT on transmitting mode by the software provided by manufacturer.
Pretest the EUT at different transmission rate and report show the worst case data.

Test condition: Mode 1

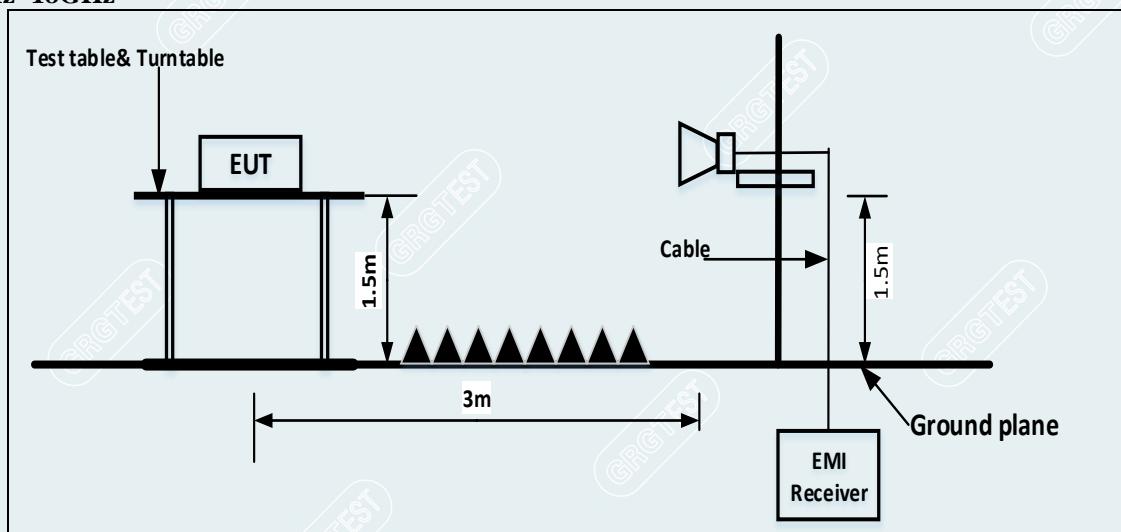
Test method: ETSI EN 301 893 clause 5.4.5.2.2

4.5.3 TEST SETUP

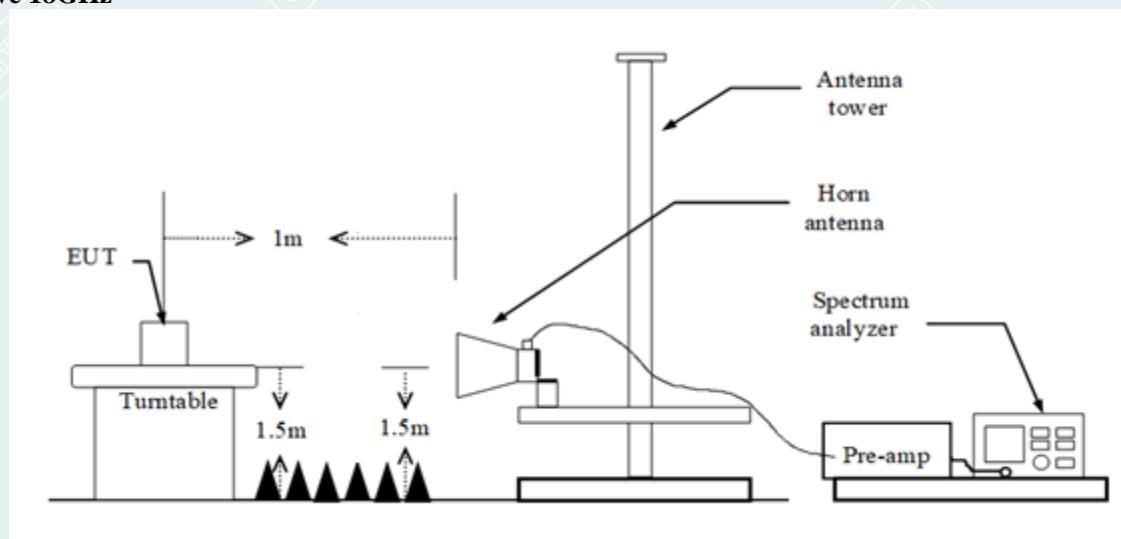
Below 1GHz



1GHz -18GHz



Above 18GHz



4.5.4 DATA SAMPLE

Freq. [MHz]	Reading [dBm]	Level [dBm]	Limit [dBm]	Margin [dB]	Factor [dB]	Detector	Polarity
XXX	-49.71	-57.90	-30.00	27.90	-8.19	RMS	Horizontal

Frequency (MHz) = Emission frequency in MHz

Reading (dBm) = Uncorrected Analyzer / Receiver reading

Level (dBm) = Reading (dBm) + Factor (dB)

Limit (dBm) = Limit stated in standard

Margin (dB) = Limit (dBm) – Level (dBm)

RMS = Root Mean Square

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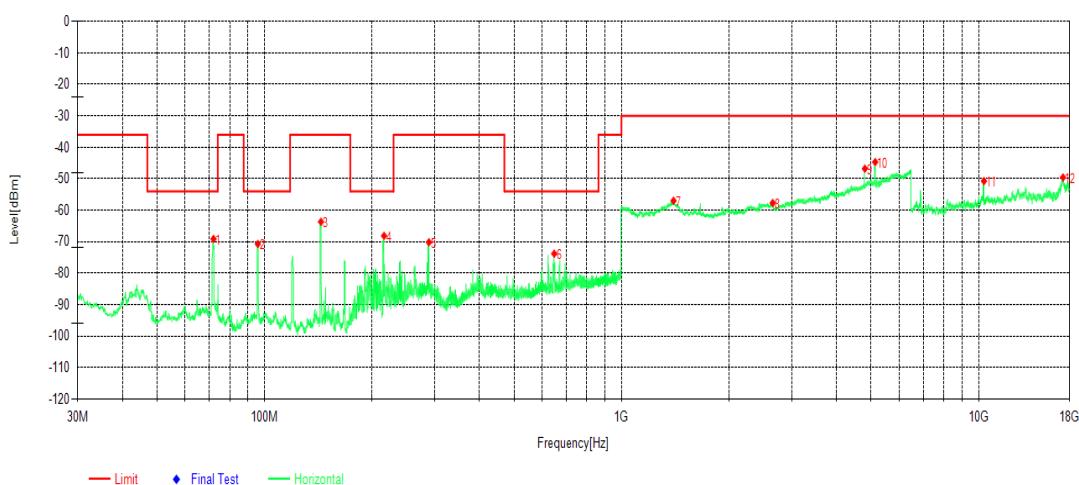
4.5.5 TEST RESULTS

30MHz-18GHz

Pre-scan all modes, the worst power supply is AC 230/50Hz (DC 5V/2A power by Adapter), in the two power supply modes, 1GHz-18GHz data only record the worst power supply mode (DC 5V/2A power by Adapter) and 30MHz-1GHz records the data of two power supply modes (DC 5V/2A power by Adapter & DC 48V/0.27A power by PoE Adapter) in this report.

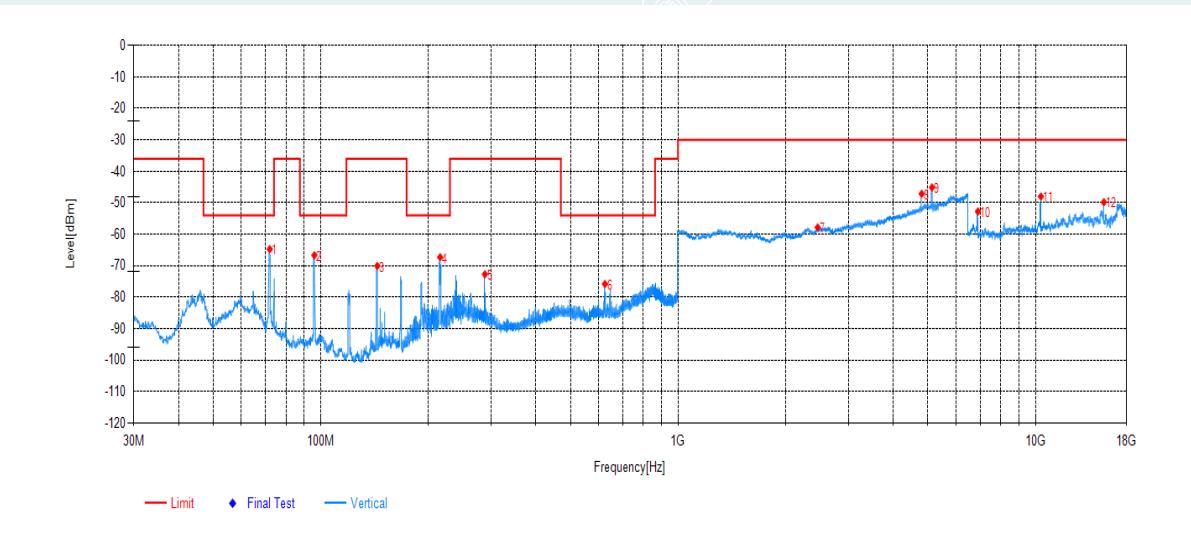
Power supply: AC 230V/50Hz(DC 5V/2A power by Adapter)

Project No	E20230331478001	EUT:	Hub M3
Model:	HM-G01E	Sample No:	E20230331478001-0004
Mode:	TX 802.11a 5180MHz	Voltage:	AC 230V/50Hz
Environment:	23.5 °C/42%RH/101.0kPa	Engineer:	Gong Xuan
Test date:	2023-11-21	/	/



Suspected Data List								
NO.	Freq. [MHz]	Reading [dBm]	Level [dBm]	Limit [dBm]	Margin [dB]	Factor [dB]	Detector	Polarity
1	72.001	-47.54	-69.10	-54.00	15.10	-21.56	RMS	Horizontal
2	95.863	-53.83	-70.69	-54.00	16.69	-16.86	RMS	Horizontal
3	143.975	-44.32	-63.65	-36.00	27.65	-19.33	RMS	Horizontal
4	216.24	-50.80	-68.12	-54.00	14.12	-17.32	RMS	Horizontal
5	288.99	-56.04	-70.15	-36.00	34.15	-14.11	RMS	Horizontal
6	648.084	-66.07	-73.77	-54.00	19.77	-7.70	RMS	Horizontal
7	1398.75	-72.79	-56.96	-30.00	26.96	15.83	RMS	Horizontal
8	2652.75	-73.94	-57.66	-30.00	27.66	16.28	RMS	Horizontal
9	4807.1	-72.91	-46.76	-30.00	16.76	26.15	RMS	Horizontal
10	5134.9	-72.15	-44.69	-30.00	14.69	27.46	RMS	Horizontal
11	10359.4	-61.17	-50.73	-30.00	20.73	10.44	RMS	Horizontal
12	17249.05	-70.23	-49.57	-30.00	19.57	20.66	RMS	Horizontal

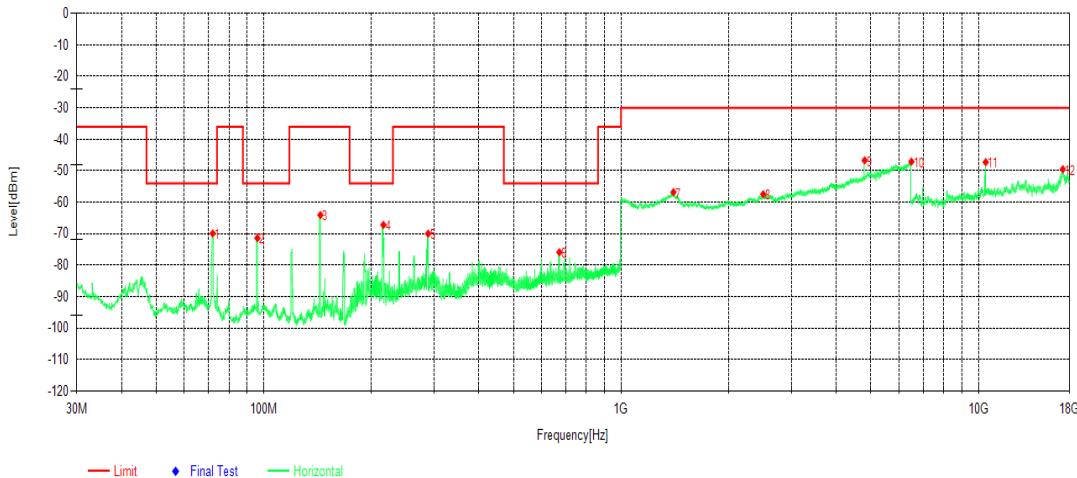
Project No	E20230331478001	EUT:	Hub M3
Model:	HM-G01E	Sample No:	E20230331478001-0004
Mode:	TX 802.11a 5180MHz	Voltage:	AC 230V/50Hz
Environment:	23.5°C/42%RH/101.0kPa	Engineer:	Gong Xuan
Test date:	2023-11-21	/	/



Suspected Data List

NO.	Freq. [MHz]	Reading [dBm]	Level [dBm]	Limit [dBm]	Margin [dB]	Factor [dB]	Detector	Polarity
1	72.001	-46.00	-64.68	-54.00	10.68	-18.68	RMS	Vertical
2	96.057	-47.36	-66.67	-54.00	12.67	-19.31	RMS	Vertical
3	143.975	-50.77	-70.06	-36.00	34.06	-19.29	RMS	Vertical
4	215.755	-49.76	-67.28	-54.00	13.28	-17.52	RMS	Vertical
5	288.02	-58.15	-72.69	-36.00	36.69	-14.54	RMS	Vertical
6	624.028	-67.73	-75.79	-54.00	21.79	-8.06	RMS	Vertical
7	2458.6	-73.71	-57.81	-30.00	27.81	15.90	RMS	Vertical
8	4806.55	-73.48	-47.12	-30.00	17.12	26.36	RMS	Vertical
9	5138.75	-72.83	-45.09	-30.00	15.09	27.74	RMS	Vertical
10	6905.95	-58.17	-52.76	-30.00	22.76	5.41	RMS	Vertical
11	10359.4	-57.81	-47.99	-30.00	17.99	9.82	RMS	Vertical
12	15542.45	-64.37	-49.79	-30.00	19.79	14.58	RMS	Vertical

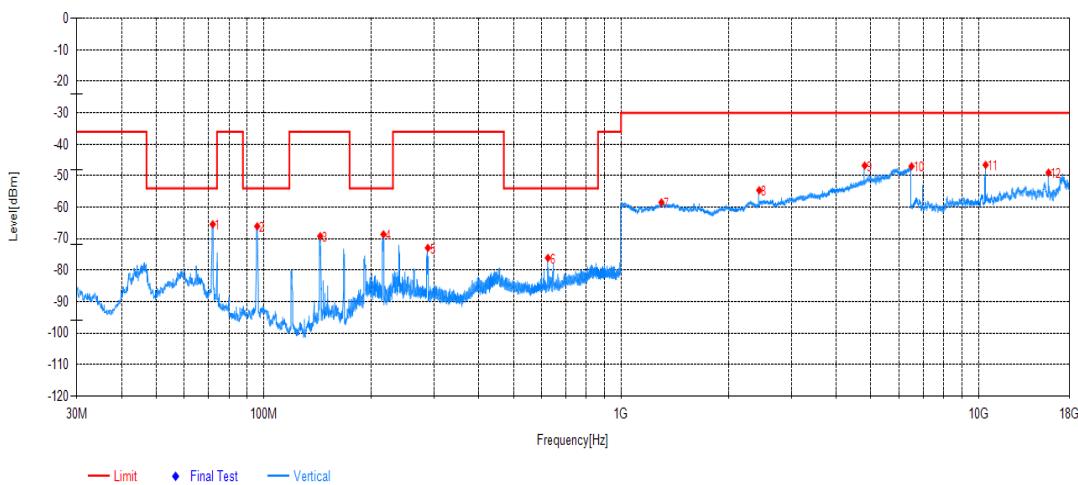
Project No	E20230331478001	EUT:	Hub M3
Model:	HM-G01E	Sample No:	E20230331478001-0004
Mode:	TX 802.11a 5240MHz	Voltage:	AC 230V/50Hz
Environment:	23.5°C/42%RH/101.0kPa	Engineer:	Gong Xuan
Test date:	2023-11-21	/	/



Suspected Data List

NO.	Freq. [MHz]	Reading [dBm]	Level [dBm]	Limit [dBm]	Margin [dB]	Factor [dB]	Detector	Polarity
1	72.001	-48.31	-69.87	-54.00	15.87	-21.56	RMS	Horizontal
2	96.057	-54.48	-71.34	-54.00	17.34	-16.86	RMS	Horizontal
3	144.072	-44.68	-64.03	-36.00	28.03	-19.35	RMS	Horizontal
4	216.24	-49.84	-67.16	-54.00	13.16	-17.32	RMS	Horizontal
5	288.602	-55.84	-69.97	-36.00	33.97	-14.13	RMS	Horizontal
6	672.043	-68.33	-75.86	-54.00	21.86	-7.53	RMS	Horizontal
7	1401.5	-72.63	-56.80	-30.00	26.80	15.83	RMS	Horizontal
8	2499.3	-73.59	-57.45	-30.00	27.45	16.14	RMS	Horizontal
9	4807.1	-72.82	-46.67	-30.00	16.67	26.15	RMS	Horizontal
10	6496.7	-78.13	-47.06	-30.00	17.06	31.07	RMS	Horizontal
11	10481.3	-58.04	-47.24	-30.00	17.24	10.80	RMS	Horizontal
12	17220.3	-70.03	-49.48	-30.00	19.48	20.55	RMS	Horizontal

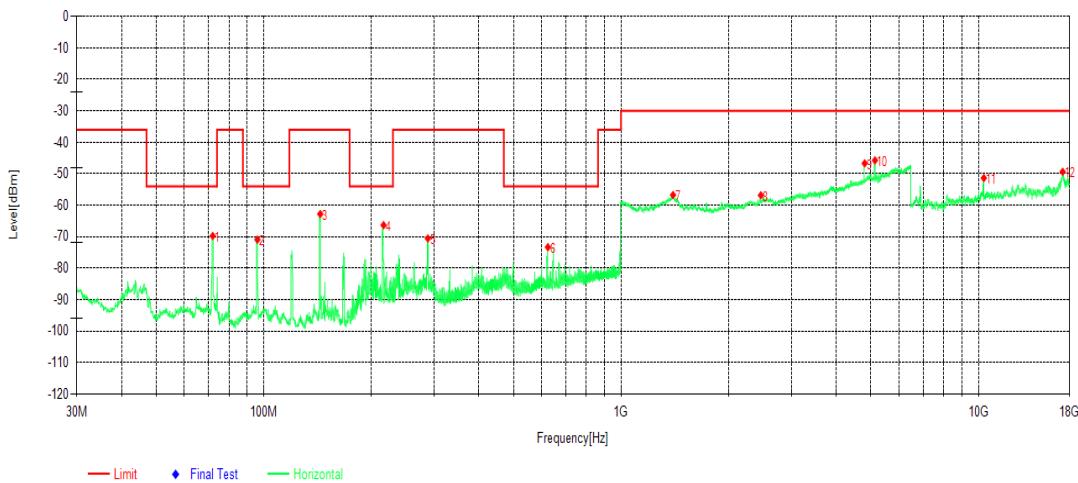
Project No	E20230331478001	EUT:	Hub M3
Model:	HM-G01E	Sample No:	E20230331478001-0004
Mode:	TX 802.11a 5240MHz	Voltage:	AC 230V/50Hz
Environment:	23.5°C/42%RH/101.0kPa	Engineer:	Gong Xuan
Test date:	2023-11-21	/	/



Suspected Data List

NO.	Freq. [MHz]	Reading [dBm]	Level [dBm]	Limit [dBm]	Margin [dB]	Factor [dB]	Detector	Polarity
1	72.001	-46.71	-65.39	-54.00	11.39	-18.68	RMS	Vertical
2	95.96	-46.72	-66.03	-54.00	12.03	-19.31	RMS	Vertical
3	143.975	-49.88	-69.17	-36.00	33.17	-19.29	RMS	Vertical
4	216.337	-51.07	-68.59	-54.00	14.59	-17.52	RMS	Vertical
5	288.02	-58.36	-72.90	-36.00	36.90	-14.54	RMS	Vertical
6	624.125	-68.03	-76.09	-54.00	22.09	-8.06	RMS	Vertical
7	1297.55	-72.14	-58.44	-30.00	28.44	13.70	RMS	Vertical
8	2437.7	-70.14	-54.58	-30.00	24.58	15.56	RMS	Vertical
9	4806.55	-73.09	-46.73	-30.00	16.73	26.36	RMS	Vertical
10	6498.9	-78.19	-46.97	-30.00	16.97	31.22	RMS	Vertical
11	10480.15	-56.57	-46.53	-30.00	16.53	10.04	RMS	Vertical
12	15713.8	-63.74	-48.99	-30.00	18.99	14.75	RMS	Vertical

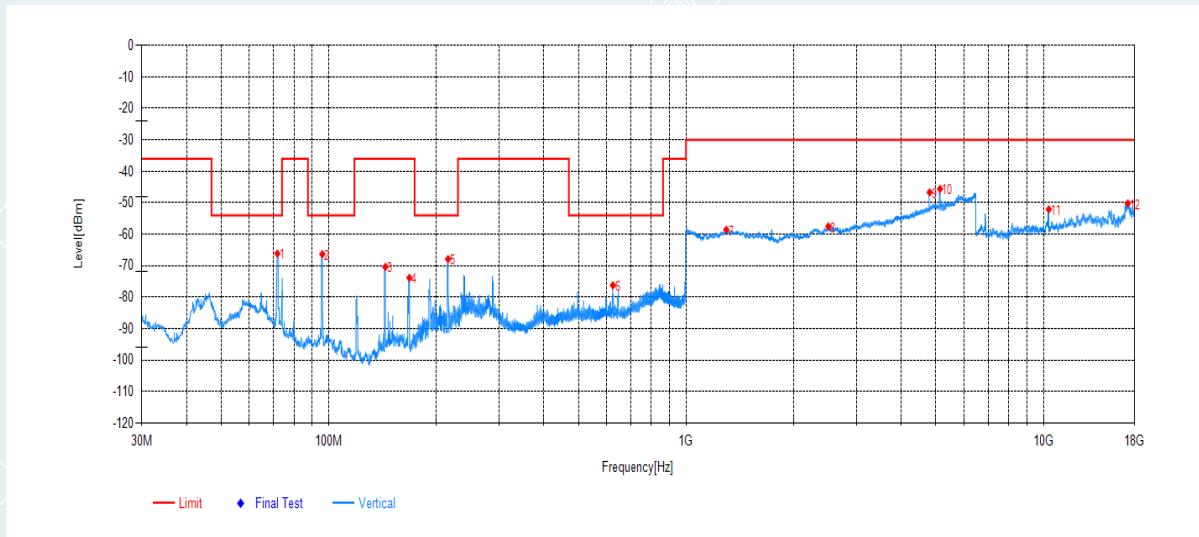
Project No	E20230331478001	EUT:	Hub M3
Model:	HM-G01E	Sample No:	E20230331478001-0004
Mode:	TX 802.11n HT20 5180MHz	Voltage:	AC 230V/50Hz
Environment:	23.5°C/42%RH/101.0kPa	Engineer:	Gong Xuan
Test date:	2023-11-21	/	/



Suspected Data List

NO.	Freq. [MHz]	Reading [dBm]	Level [dBm]	Limit [dBm]	Margin [dB]	Factor [dB]	Detector	Polarity
1	72.001	-48.16	-69.72	-54.00	15.72	-21.56	RMS	Horizontal
2	96.057	-54.05	-70.91	-54.00	16.91	-16.86	RMS	Horizontal
3	143.975	-43.45	-62.78	-36.00	26.78	-19.33	RMS	Horizontal
4	216.531	-48.98	-66.29	-54.00	12.29	-17.31	RMS	Horizontal
5	288.02	-56.39	-70.53	-36.00	34.53	-14.14	RMS	Horizontal
6	624.028	-65.14	-73.31	-54.00	19.31	-8.17	RMS	Horizontal
7	1398.2	-72.54	-56.72	-30.00	26.72	15.82	RMS	Horizontal
8	2462.45	-72.70	-56.81	-30.00	26.81	15.89	RMS	Horizontal
9	4806.55	-72.81	-46.67	-30.00	16.67	26.14	RMS	Horizontal
10	5136.55	-73.21	-45.74	-30.00	15.74	27.47	RMS	Horizontal
11	10360.55	-61.76	-51.34	-30.00	21.34	10.42	RMS	Horizontal
12	17213.4	-69.89	-49.36	-30.00	19.36	20.53	RMS	Horizontal

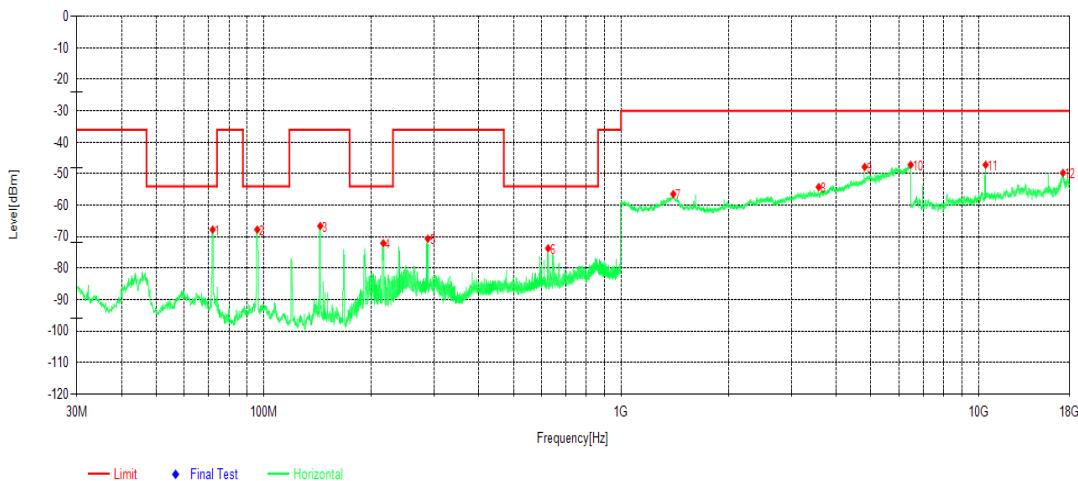
Project No	E20230331478001	EUT:	Hub M3
Model:	HM-G01E	Sample No:	E20230331478001-0004
Mode:	TX 802.11n HT20 5180MHz	Voltage:	AC 230V/50Hz
Environment:	23.5°C/42%RH/101.0kPa	Engineer:	Gong Xuan
Test date:	2023-11-21	/	/



Suspected Data List

NO.	Freq. [MHz]	Reading [dBm]	Level [dBm]	Limit [dBm]	Margin [dB]	Factor [dB]	Detector	Polarity
1	71.807	-47.51	-66.12	-54.00	12.12	-18.61	RMS	Vertical
2	95.96	-47.02	-66.33	-54.00	12.33	-19.31	RMS	Vertical
3	144.072	-51.05	-70.33	-36.00	34.33	-19.28	RMS	Vertical
4	168.225	-55.96	-73.83	-36.00	37.83	-17.87	RMS	Vertical
5	215.755	-50.36	-67.88	-54.00	13.88	-17.52	RMS	Vertical
6	624.028	-68.14	-76.20	-54.00	22.20	-8.06	RMS	Vertical
7	1296.45	-72.24	-58.56	-30.00	28.56	13.68	RMS	Vertical
8	2500.95	-73.70	-57.49	-30.00	27.49	16.21	RMS	Vertical
9	4807.1	-73.03	-46.67	-30.00	16.67	26.36	RMS	Vertical
10	5137.65	-73.28	-45.55	-30.00	15.55	27.73	RMS	Vertical
11	10359.4	-61.90	-52.08	-30.00	22.08	9.82	RMS	Vertical
12	17223.75	-70.23	-50.19	-30.00	20.19	20.04	RMS	Vertical

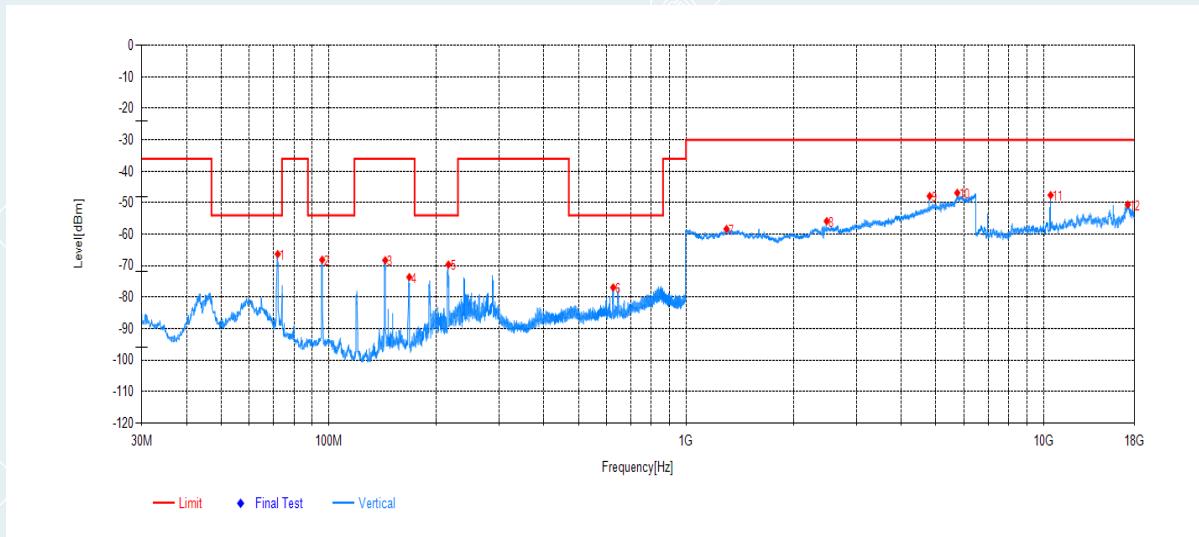
Project No	E20230331478001	EUT:	Hub M3
Model:	HM-G01E	Sample No:	E20230331478001-0004
Mode:	TX 802.11n HT20 5240MHz	Voltage:	AC 230V/50Hz
Environment:	23.5°C/42%RH/101.0kPa	Engineer:	Gong Xuan
Test date:	2023-11-21	/	/



Suspected Data List

NO.	Freq. [MHz]	Reading [dBm]	Level [dBm]	Limit [dBm]	Margin [dB]	Factor [dB]	Detector	Polarity
1	72.001	-46.15	-67.71	-54.00	13.71	-21.56	RMS	Horizontal
2	95.96	-50.86	-67.72	-54.00	13.72	-16.86	RMS	Horizontal
3	143.975	-47.25	-66.58	-36.00	30.58	-19.33	RMS	Horizontal
4	216.046	-54.71	-72.03	-54.00	18.03	-17.32	RMS	Horizontal
5	288.02	-56.48	-70.62	-36.00	34.62	-14.14	RMS	Horizontal
6	624.998	-65.50	-73.66	-54.00	19.66	-8.16	RMS	Horizontal
7	1399.85	-72.29	-56.42	-30.00	26.42	15.87	RMS	Horizontal
8	3575.1	-73.87	-54.20	-30.00	24.20	19.67	RMS	Horizontal
9	4806.55	-73.94	-47.80	-30.00	17.80	26.14	RMS	Horizontal
10	6459.85	-78.03	-47.14	-30.00	17.14	30.89	RMS	Horizontal
11	10480.15	-57.96	-47.16	-30.00	17.16	10.80	RMS	Horizontal
12	17246.75	-70.38	-49.73	-30.00	19.73	20.65	RMS	Horizontal

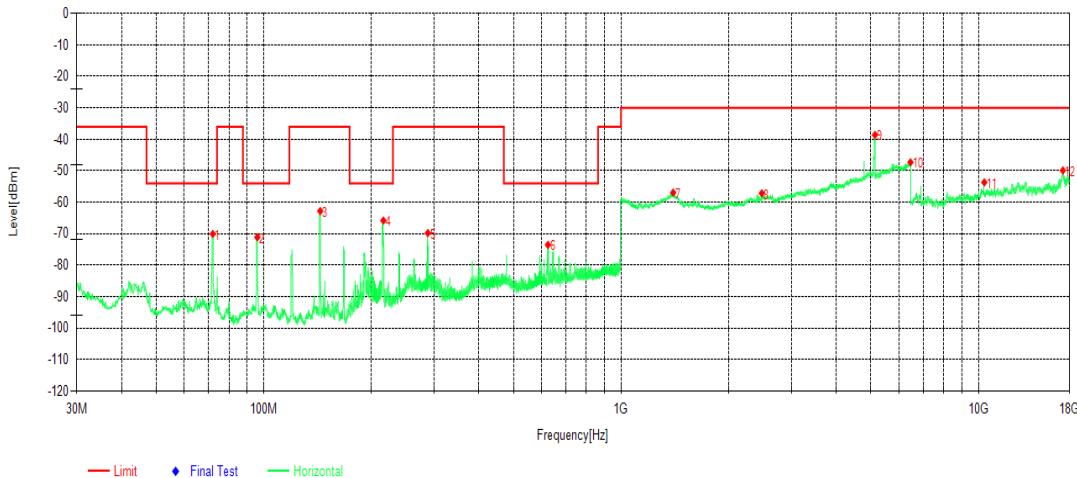
Project No	E20230331478001	EUT:	Hub M3
Model:	HM-G01E	Sample No:	E20230331478001-0004
Mode:	TX 802.11n HT20 5240MHz	Voltage:	AC 230V/50Hz
Environment:	23.5°C/42%RH/101.0kPa	Engineer:	Gong Xuan
Test date:	2023-11-21	/	/



Suspected Data List

NO.	Freq. [MHz]	Reading [dBm]	Level [dBm]	Limit [dBm]	Margin [dB]	Factor [dB]	Detector	Polarity
1	72.001	-47.63	-66.31	-54.00	12.31	-18.68	RMS	Vertical
2	95.96	-48.77	-68.08	-54.00	14.08	-19.31	RMS	Vertical
3	143.975	-48.96	-68.25	-36.00	32.25	-19.29	RMS	Vertical
4	168.128	-55.71	-73.58	-36.00	37.58	-17.87	RMS	Vertical
5	216.337	-52.10	-69.62	-54.00	15.62	-17.52	RMS	Vertical
6	625.386	-68.90	-76.90	-54.00	22.90	-8.00	RMS	Vertical
7	1297.55	-71.99	-58.29	-30.00	28.29	13.70	RMS	Vertical
8	2476.75	-71.85	-55.82	-30.00	25.82	16.03	RMS	Vertical
9	4806.55	-74.22	-47.86	-30.00	17.86	26.36	RMS	Vertical
10	5740.45	-76.97	-46.84	-30.00	16.84	30.13	RMS	Vertical
11	10479	-57.59	-47.56	-30.00	17.56	10.03	RMS	Vertical
12	17223.75	-70.61	-50.57	-30.00	20.57	20.04	RMS	Vertical

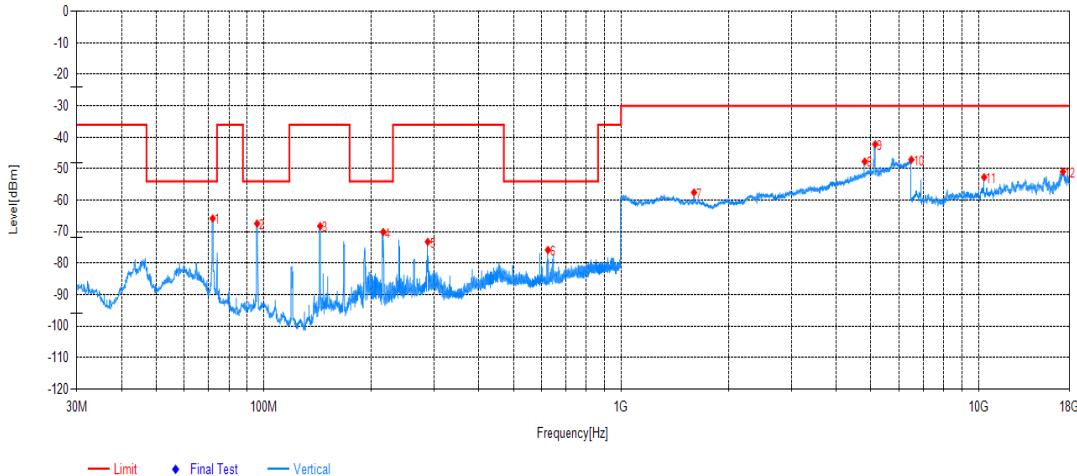
Project No	E20230331478001	EUT:	Hub M3
Model:	HM-G01E	Sample No:	E20230331478001-0004
Mode:	TX 802.11n HT40 5190MHz	Voltage:	AC 230V/50Hz
Environment:	23.5°C/42%RH/101.0kPa	Engineer:	Gong Xuan
Test date:	2023-11-21	/	/



Suspected Data List

NO.	Freq. [MHz]	Reading [dBm]	Level [dBm]	Limit [dBm]	Margin [dB]	Factor [dB]	Detector	Polarity
1	72.001	-48.49	-70.05	-54.00	16.05	-21.56	RMS	Horizontal
2	95.96	-54.26	-71.12	-54.00	17.12	-16.86	RMS	Horizontal
3	143.975	-43.45	-62.78	-36.00	26.78	-19.33	RMS	Horizontal
4	216.24	-48.48	-65.80	-54.00	11.80	-17.32	RMS	Horizontal
5	288.02	-55.66	-69.80	-36.00	33.80	-14.14	RMS	Horizontal
6	624.222	-65.33	-73.50	-54.00	19.50	-8.17	RMS	Horizontal
7	1398.75	-72.76	-56.93	-30.00	26.93	15.83	RMS	Horizontal
8	2476.2	-73.11	-57.13	-30.00	27.13	15.98	RMS	Horizontal
9	5135.45	-66.05	-38.59	-30.00	8.59	27.46	RMS	Horizontal
10	6458.75	-78.16	-47.28	-30.00	17.28	30.88	RMS	Horizontal
11	10390.45	-63.62	-53.68	-30.00	23.68	9.94	RMS	Horizontal
12	17232.95	-70.47	-49.87	-30.00	19.87	20.60	RMS	Horizontal

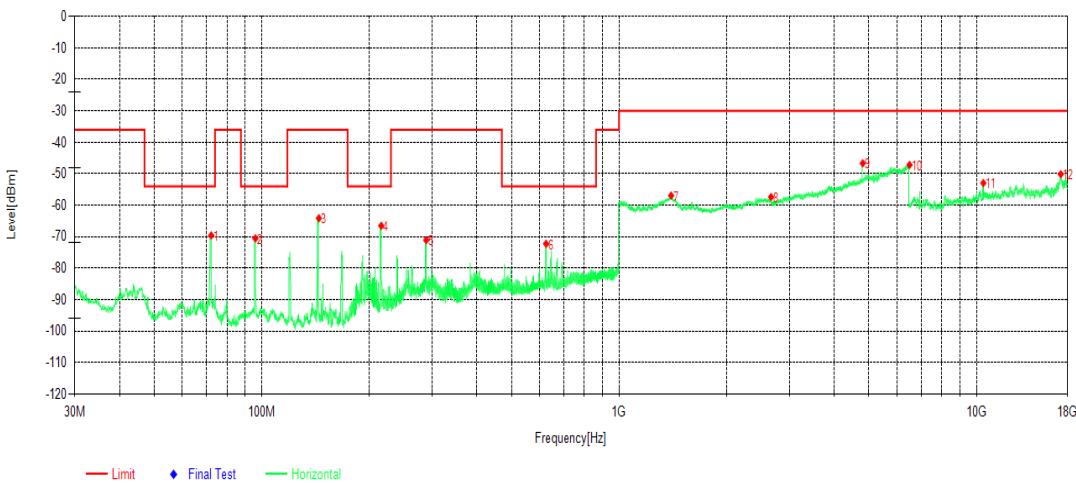
Project No	E20230331478001	EUT:	Hub M3
Model:	HM-G01E	Sample No:	E20230331478001-0004
Mode:	TX 802.11n HT40 5190MHz	Voltage:	AC 230V/50Hz
Environment:	23.5°C/42%RH/101.0kPa	Engineer:	Gong Xuan
Test date:	2023-11-21	/	/



Suspected Data List

NO.	Freq. [MHz]	Reading [dBm]	Level [dBm]	Limit [dBm]	Margin [dB]	Factor [dB]	Detector	Polarity
1	72.001	-47.08	-65.76	-54.00	11.76	-18.68	RMS	Vertical
2	95.863	-48.07	-67.39	-54.00	13.39	-19.32	RMS	Vertical
3	143.975	-48.91	-68.20	-36.00	32.20	-19.29	RMS	Vertical
4	216.046	-52.56	-70.08	-54.00	16.08	-17.52	RMS	Vertical
5	288.02	-58.66	-73.20	-36.00	37.20	-14.54	RMS	Vertical
6	624.222	-67.73	-75.79	-54.00	21.79	-8.06	RMS	Vertical
7	1600.6	-70.67	-57.51	-30.00	27.51	13.16	RMS	Vertical
8	4806.55	-74.05	-47.69	-30.00	17.69	26.36	RMS	Vertical
9	5141.5	-69.97	-42.22	-30.00	12.22	27.75	RMS	Vertical
10	6492.3	-78.26	-47.08	-30.00	17.08	31.18	RMS	Vertical
11	10377.8	-62.08	-52.68	-30.00	22.68	9.40	RMS	Vertical
12	17247.9	-70.97	-50.91	-30.00	20.91	20.06	RMS	Vertical

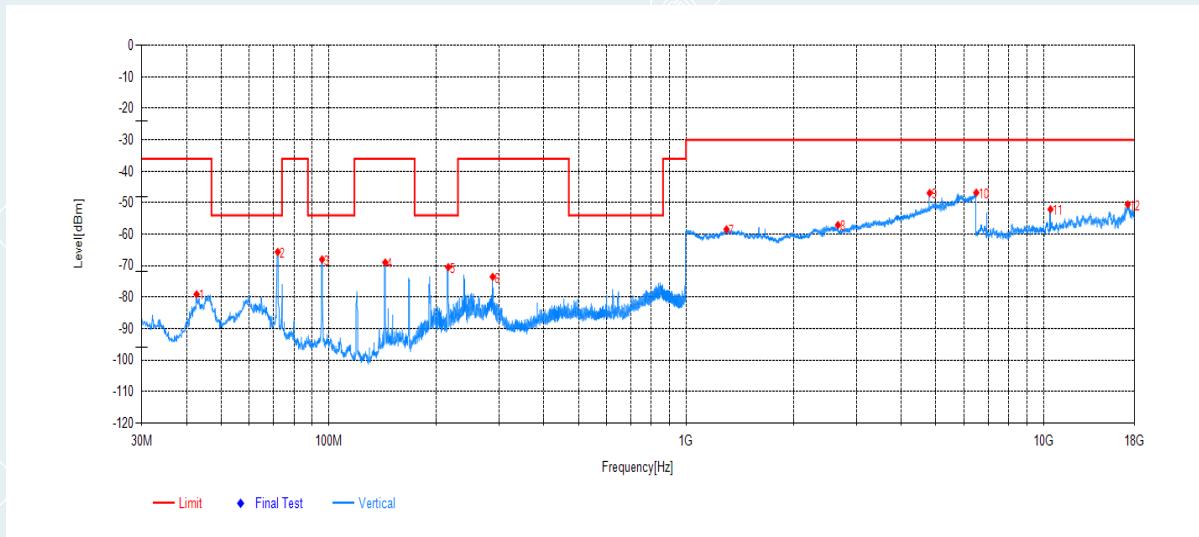
Project No	E20230331478001	EUT:	Hub M3
Model:	HM-G01E	Sample No:	E20230331478001-0004
Mode:	TX 802.11n HT40 5230MHz	Voltage:	AC 230V/50Hz
Environment:	23.5°C/42%RH/101.0kPa	Engineer:	Gong Xuan
Test date:	2023-11-21	/	/



Suspected Data List

NO.	Freq. [MHz]	Reading [dBm]	Level [dBm]	Limit [dBm]	Margin [dB]	Factor [dB]	Detector	Polarity
1	72.195	-47.97	-69.58	-54.00	15.58	-21.61	RMS	Horizontal
2	96.057	-53.66	-70.52	-54.00	16.52	-16.86	RMS	Horizontal
3	144.557	-44.64	-64.09	-36.00	28.09	-19.45	RMS	Horizontal
4	216.046	-49.15	-66.47	-54.00	12.47	-17.32	RMS	Horizontal
5	288.796	-56.95	-71.06	-36.00	35.06	-14.11	RMS	Horizontal
6	624.901	-64.07	-72.23	-54.00	18.23	-8.16	RMS	Horizontal
7	1398.75	-72.75	-56.92	-30.00	26.92	15.83	RMS	Horizontal
8	2663.2	-73.44	-57.37	-30.00	27.37	16.07	RMS	Horizontal
9	4806.55	-72.79	-46.65	-30.00	16.65	26.14	RMS	Horizontal
10	6498.35	-78.25	-47.17	-30.00	17.17	31.08	RMS	Horizontal
11	10458.3	-63.72	-52.93	-30.00	22.93	10.79	RMS	Horizontal
12	17222.6	-70.68	-50.12	-30.00	20.12	20.56	RMS	Horizontal

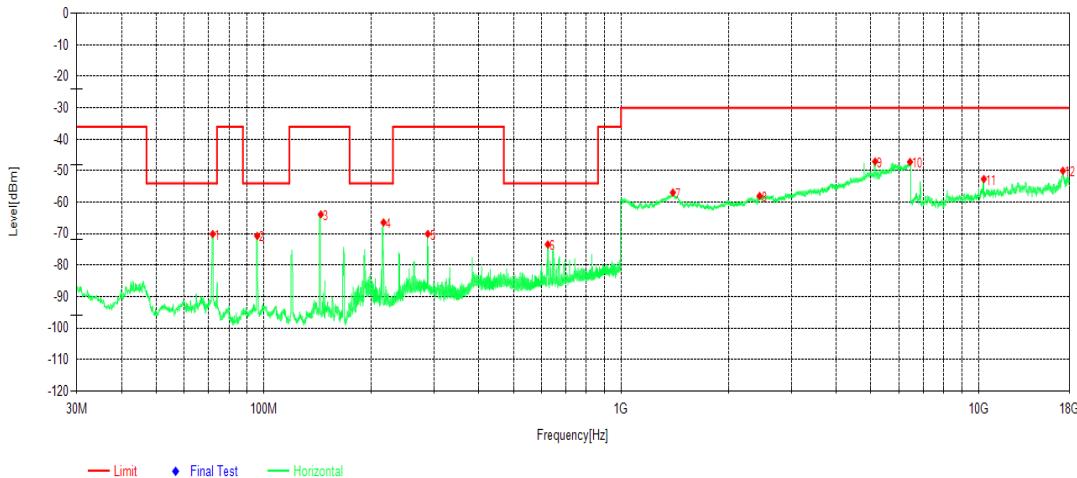
Project No	E20230331478001	EUT:	Hub M3
Model:	HM-G01E	Sample No:	E20230331478001-0004
Mode:	TX 802.11n HT40 5230MHz	Voltage:	AC 230V/50Hz
Environment:	23.5°C/42%RH/101.0kPa	Engineer:	Gong Xuan
Test date:	2023-11-21	/	/



Suspected Data List

NO.	Freq. [MHz]	Reading [dBm]	Level [dBm]	Limit [dBm]	Margin [dB]	Factor [dB]	Detector	Polarity
1	42.707	-65.22	-79.07	-36.00	43.07	-13.85	RMS	Vertical
2	72.001	-46.93	-65.61	-54.00	11.61	-18.68	RMS	Vertical
3	95.863	-48.67	-67.99	-54.00	13.99	-19.32	RMS	Vertical
4	143.975	-49.66	-68.95	-36.00	32.95	-19.29	RMS	Vertical
5	216.046	-52.92	-70.44	-54.00	16.44	-17.52	RMS	Vertical
6	287.632	-58.98	-73.53	-36.00	37.53	-14.55	RMS	Vertical
7	1297.55	-72.12	-58.42	-30.00	28.42	13.70	RMS	Vertical
8	2661.55	-73.25	-57.05	-30.00	27.05	16.20	RMS	Vertical
9	4806.55	-73.25	-46.89	-30.00	16.89	26.36	RMS	Vertical
10	6489.55	-77.93	-46.78	-30.00	16.78	31.15	RMS	Vertical
11	10468.65	-62.08	-52.06	-30.00	22.06	10.02	RMS	Vertical
12	17223.75	-70.55	-50.51	-30.00	20.51	20.04	RMS	Vertical

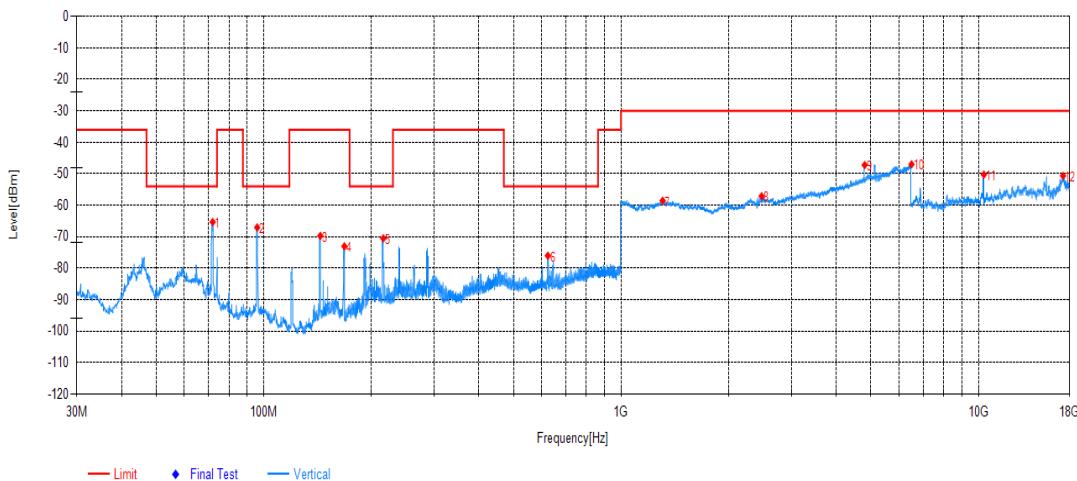
Project No	E20230331478001	EUT:	Hub M3
Model:	HM-G01E	Sample No:	E20230331478001-0004
Mode:	TX 802.11ac VHT20 5180MHz	Voltage:	AC 230V/50Hz
Environment:	23.5°C/42%RH/101.0kPa	Engineer:	Gong Xuan
Test date:	2023-11-21	/	/



Suspected Data List

NO.	Freq. [MHz]	Reading [dBm]	Level [dBm]	Limit [dBm]	Margin [dB]	Factor [dB]	Detector	Polarity
1	72.001	-48.52	-70.08	-54.00	16.08	-21.56	RMS	Horizontal
2	95.96	-53.81	-70.67	-54.00	16.67	-16.86	RMS	Horizontal
3	144.557	-44.38	-63.83	-36.00	27.83	-19.45	RMS	Horizontal
4	216.337	-49.09	-66.40	-54.00	12.40	-17.31	RMS	Horizontal
5	288.02	-55.91	-70.05	-36.00	34.05	-14.14	RMS	Horizontal
6	623.737	-65.19	-73.38	-54.00	19.38	-8.19	RMS	Horizontal
7	1397.1	-72.71	-56.92	-30.00	26.92	15.79	RMS	Horizontal
8	2442.65	-73.63	-58.00	-30.00	28.00	15.63	RMS	Horizontal
9	5140.4	-74.56	-47.07	-30.00	17.07	27.49	RMS	Horizontal
10	6437.3	-77.92	-47.17	-30.00	17.17	30.75	RMS	Horizontal
11	10359.4	-63.05	-52.61	-30.00	22.61	10.44	RMS	Horizontal
12	17245.6	-70.63	-49.98	-30.00	19.98	20.65	RMS	Horizontal

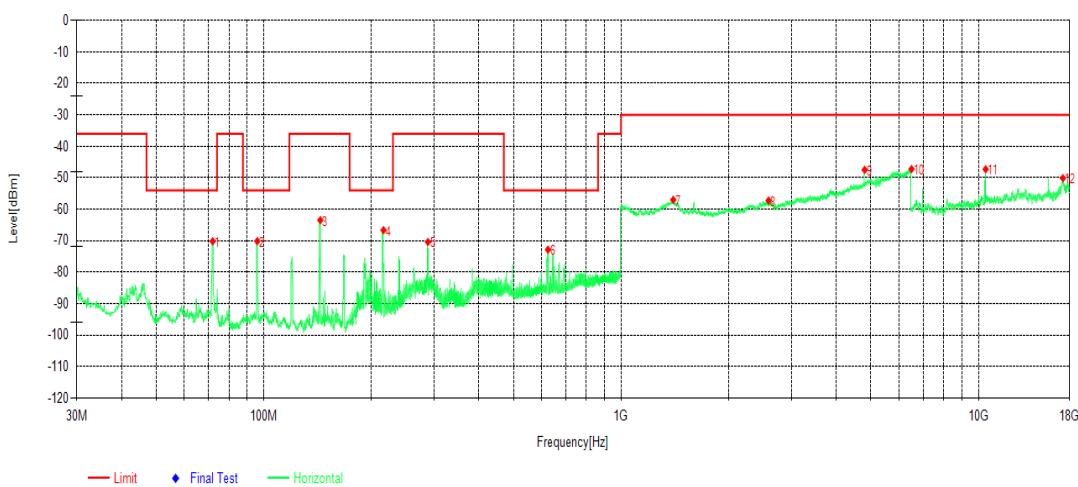
Project No	E20230331478001	EUT:	Hub M3
Model:	HM-G01E	Sample No:	E20230331478001-0004
Mode:	TX 802.11ac VHT20 5180MHz	Voltage:	AC 230V/50Hz
Environment:	23.5°C/42%RH/101.0kPa	Engineer:	Gong Xuan
Test date:	2023-11-21	/	/



Suspected Data List

NO.	Freq. [MHz]	Reading [dBm]	Level [dBm]	Limit [dBm]	Margin [dB]	Factor [dB]	Detector	Polarity
1	72.001	-46.65	-65.33	-54.00	11.33	-18.68	RMS	Vertical
2	95.96	-47.74	-67.05	-54.00	13.05	-19.31	RMS	Vertical
3	144.072	-50.44	-69.72	-36.00	33.72	-19.28	RMS	Vertical
4	168.128	-55.18	-73.05	-36.00	37.05	-17.87	RMS	Vertical
5	216.046	-52.98	-70.50	-54.00	16.50	-17.52	RMS	Vertical
6	624.125	-67.96	-76.02	-54.00	22.02	-8.06	RMS	Vertical
7	1306.9	-72.28	-58.53	-30.00	28.53	13.75	RMS	Vertical
8	2474	-73.13	-57.12	-30.00	27.12	16.01	RMS	Vertical
9	4807.1	-73.57	-47.21	-30.00	17.21	26.36	RMS	Vertical
10	6498.9	-78.19	-46.97	-30.00	16.97	31.22	RMS	Vertical
11	10359.4	-60.07	-50.25	-30.00	20.25	9.82	RMS	Vertical
12	17249.05	-70.71	-50.65	-30.00	20.65	20.06	RMS	Vertical

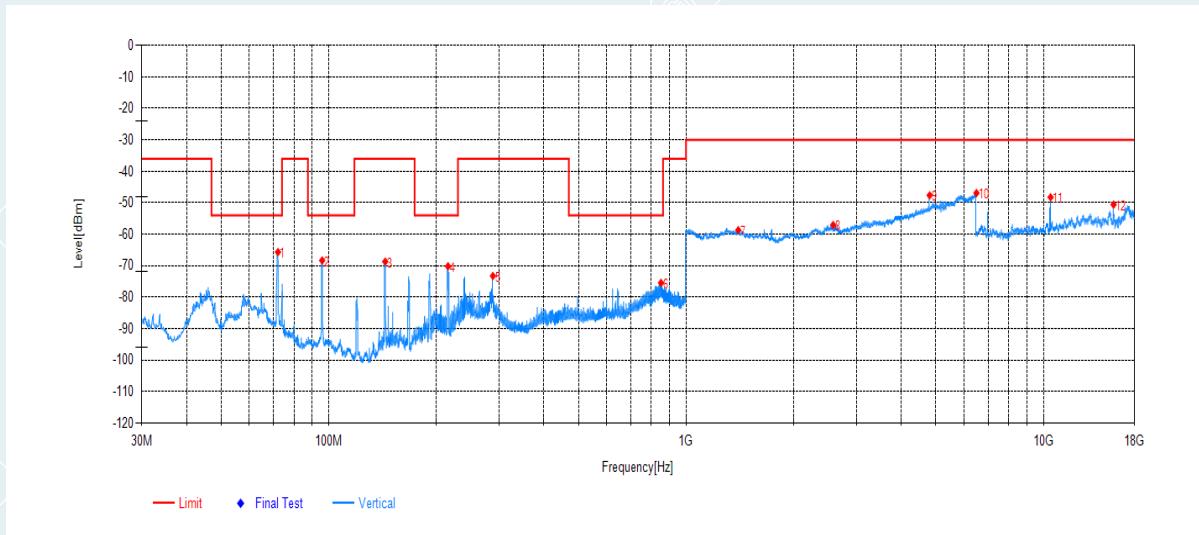
Project No	E20230331478001	EUT:	Hub M3
Model:	HM-G01E	Sample No:	E20230331478001-0004
Mode:	TX 802.11ac VHT20 5240MHz	Voltage:	AC 230V/50Hz
Environment:	23.5°C/42%RH/101.0kPa	Engineer:	Gong Xuan
Test date:	2023-11-21	/	/



Suspected Data List

NO.	Freq. [MHz]	Reading [dBm]	Level [dBm]	Limit [dBm]	Margin [dB]	Factor [dB]	Detector	Polarity
1	72.001	-48.60	-70.16	-54.00	16.16	-21.56	RMS	Horizontal
2	95.96	-53.25	-70.11	-54.00	16.11	-16.86	RMS	Horizontal
3	143.975	-44.14	-63.47	-36.00	27.47	-19.33	RMS	Horizontal
4	216.434	-49.32	-66.63	-54.00	12.63	-17.31	RMS	Horizontal
5	288.311	-56.24	-70.37	-36.00	34.37	-14.13	RMS	Horizontal
6	624.707	-64.66	-72.82	-54.00	18.82	-8.16	RMS	Horizontal
7	1399.85	-72.85	-56.98	-30.00	26.98	15.87	RMS	Horizontal
8	2586.75	-73.44	-57.22	-30.00	27.22	16.22	RMS	Horizontal
9	4806.55	-73.59	-47.45	-30.00	17.45	26.14	RMS	Horizontal
10	6500	-78.30	-47.21	-30.00	17.21	31.09	RMS	Horizontal
11	10477.85	-58.08	-47.27	-30.00	17.27	10.81	RMS	Horizontal
12	17237.55	-70.72	-50.10	-30.00	20.10	20.62	RMS	Horizontal

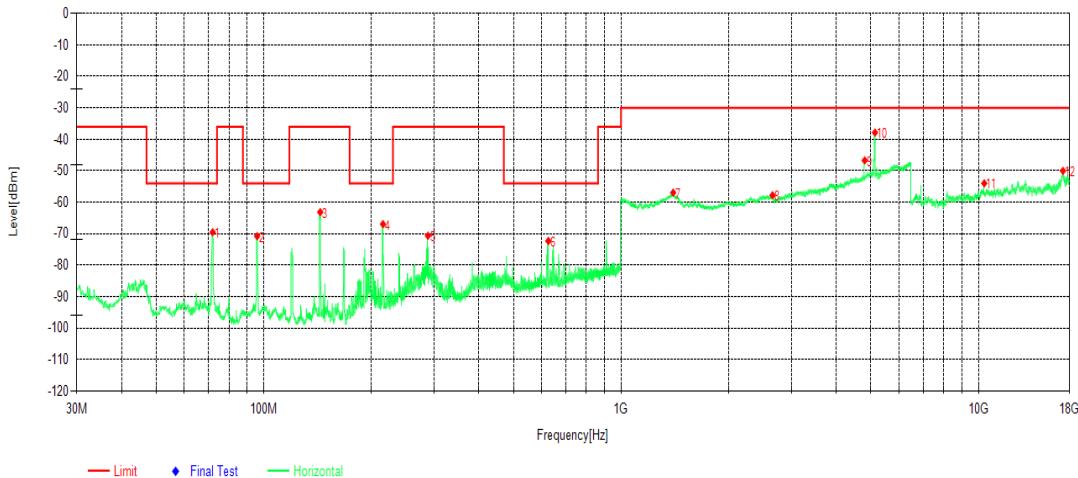
Project No	E20230331478001	EUT:	Hub M3
Model:	HM-G01E	Sample No:	E20230331478001-0004
Mode:	TX 802.11ac VHT20 5240MHz	Voltage:	AC 230V/50Hz
Environment:	23.5°C/42%RH/101.0kPa	Engineer:	Gong Xuan
Test date:	2023-11-21	/	/



Suspected Data List

NO.	Freq. [MHz]	Reading [dBm]	Level [dBm]	Limit [dBm]	Margin [dB]	Factor [dB]	Detector	Polarity
1	72.098	-46.93	-65.65	-54.00	11.65	-18.72	RMS	Vertical
2	95.863	-48.98	-68.30	-54.00	14.30	-19.32	RMS	Vertical
3	143.975	-49.39	-68.68	-36.00	32.68	-19.29	RMS	Vertical
4	215.755	-52.63	-70.15	-54.00	16.15	-17.52	RMS	Vertical
5	288.117	-58.69	-73.23	-36.00	37.23	-14.54	RMS	Vertical
6	851.202	-71.47	-75.41	-54.00	21.41	-3.94	RMS	Vertical
7	1400.4	-72.50	-58.69	-30.00	28.69	13.81	RMS	Vertical
8	2580.15	-73.14	-57.05	-30.00	27.05	16.09	RMS	Vertical
9	4807.1	-73.99	-47.63	-30.00	17.63	26.36	RMS	Vertical
10	6496.7	-78.08	-46.88	-30.00	16.88	31.20	RMS	Vertical
11	10479	-58.26	-48.23	-30.00	18.23	10.03	RMS	Vertical
12	15720.7	-65.61	-50.56	-30.00	20.56	15.05	RMS	Vertical

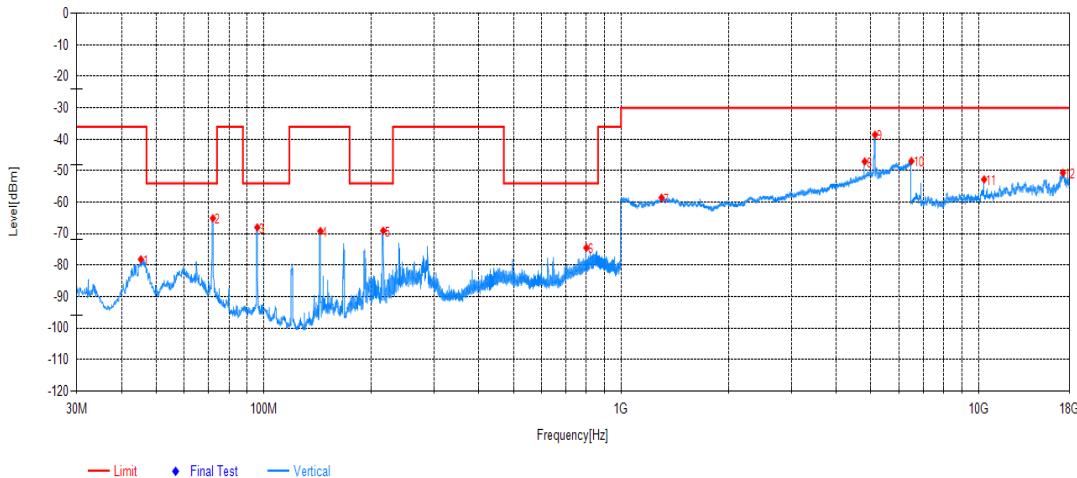
Project No	E20230331478001	EUT:	Hub M3
Model:	HM-G01E	Sample No:	E20230331478001-0004
Mode:	TX 802.11ac VHT40 5190MHz	Voltage:	AC 230V/50Hz
Environment:	23.5°C/42%RH/101.0kPa	Engineer:	Gong Xuan
Test date:	2023-11-21	/	/



Suspected Data List

NO.	Freq. [MHz]	Reading [dBm]	Level [dBm]	Limit [dBm]	Margin [dB]	Factor [dB]	Detector	Polarity
1	72.001	-47.95	-69.51	-54.00	15.51	-21.56	RMS	Horizontal
2	95.863	-53.90	-70.76	-54.00	16.76	-16.86	RMS	Horizontal
3	143.975	-43.80	-63.13	-36.00	27.13	-19.33	RMS	Horizontal
4	215.658	-49.60	-66.93	-54.00	12.93	-17.33	RMS	Horizontal
5	288.117	-56.49	-70.63	-36.00	34.63	-14.14	RMS	Horizontal
6	626.259	-64.15	-72.27	-54.00	18.27	-8.12	RMS	Horizontal
7	1399.3	-72.80	-56.95	-30.00	26.95	15.85	RMS	Horizontal
8	2654.4	-74.01	-57.76	-30.00	27.76	16.25	RMS	Horizontal
9	4807.1	-72.85	-46.70	-30.00	16.70	26.15	RMS	Horizontal
10	5135.45	-65.30	-37.84	-30.00	7.84	27.46	RMS	Horizontal
11	10383.55	-64.00	-53.95	-30.00	23.95	10.05	RMS	Horizontal
12	17252.5	-70.67	-50.01	-30.00	20.01	20.66	RMS	Horizontal

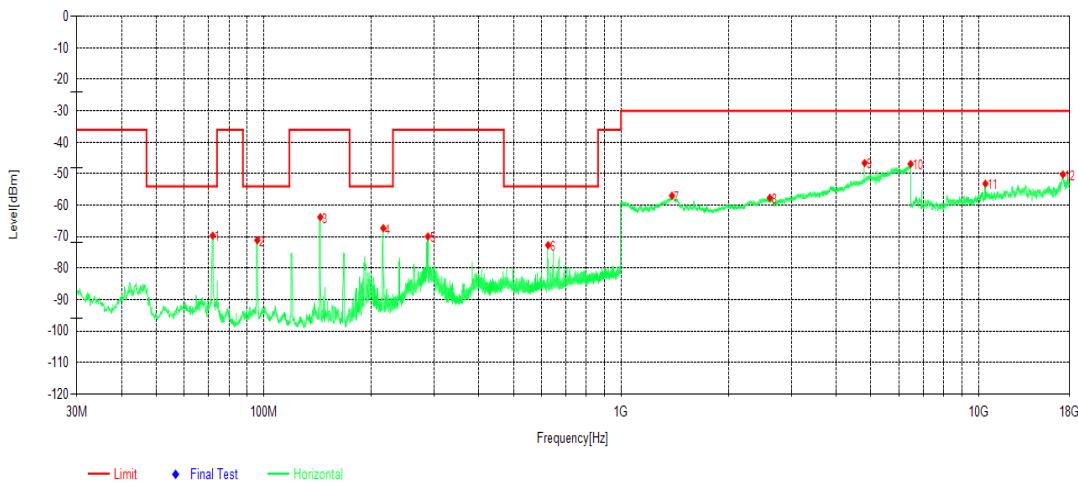
Project No	E20230331478001	EUT:	Hub M3
Model:	HM-G01E	Sample No:	E20230331478001-0004
Mode:	TX 802.11ac VHT40 5190MHz	Voltage:	AC 230V/50Hz
Environment:	23.5°C/42%RH/101.0kPa	Engineer:	Gong Xuan
Test date:	2023-11-21	/	/



Suspected Data List

NO.	Freq. [MHz]	Reading [dBm]	Level [dBm]	Limit [dBm]	Margin [dB]	Factor [dB]	Detector	Polarity
1	45.326	-64.43	-78.12	-36.00	42.12	-13.69	RMS	Vertical
2	72.098	-46.33	-65.05	-54.00	11.05	-18.72	RMS	Vertical
3	95.96	-48.66	-67.97	-54.00	13.97	-19.31	RMS	Vertical
4	144.072	-49.86	-69.14	-36.00	33.14	-19.28	RMS	Vertical
5	216.046	-51.52	-69.04	-54.00	15.04	-17.52	RMS	Vertical
6	799.986	-69.03	-74.44	-54.00	20.44	-5.41	RMS	Vertical
7	1298.65	-72.27	-58.54	-30.00	28.54	13.73	RMS	Vertical
8	4807.1	-73.39	-47.03	-30.00	17.03	26.36	RMS	Vertical
9	5134.9	-66.24	-38.53	-30.00	8.53	27.71	RMS	Vertical
10	6496.15	-78.11	-46.91	-30.00	16.91	31.20	RMS	Vertical
11	10376.65	-62.16	-52.73	-30.00	22.73	9.43	RMS	Vertical
12	17247.9	-70.70	-50.64	-30.00	20.64	20.06	RMS	Vertical

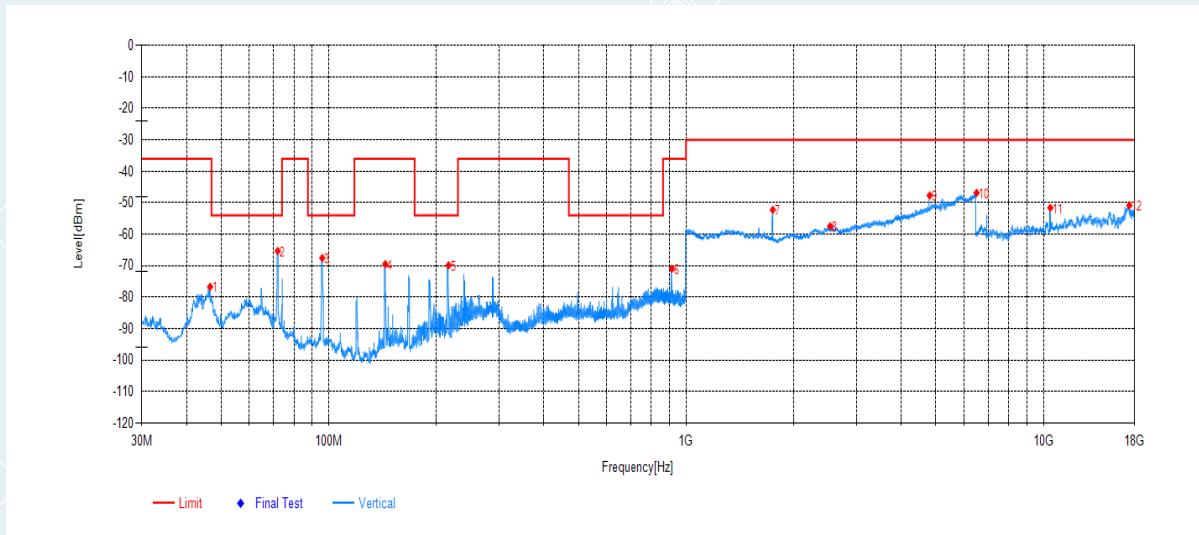
Project No	E20230331478001	EUT:	Hub M3
Model:	HM-G01E	Sample No:	E20230331478001-0004
Mode:	TX 802.11ac VHT40 5230MHz	Voltage:	AC 230V/50Hz
Environment:	23.5°C/42%RH/101.0kPa	Engineer:	Gong Xuan
Test date:	2023-11-21	/	/



Suspected Data List

NO.	Freq. [MHz]	Reading [dBm]	Level [dBm]	Limit [dBm]	Margin [dB]	Factor [dB]	Detector	Polarity
1	72.001	-48.07	-69.63	-54.00	15.63	-21.56	RMS	Horizontal
2	95.96	-54.27	-71.13	-54.00	17.13	-16.86	RMS	Horizontal
3	143.975	-44.43	-63.76	-36.00	27.76	-19.33	RMS	Horizontal
4	216.046	-49.97	-67.29	-54.00	13.29	-17.32	RMS	Horizontal
5	288.02	-55.77	-69.91	-36.00	33.91	-14.14	RMS	Horizontal
6	625.192	-64.52	-72.67	-54.00	18.67	-8.15	RMS	Horizontal
7	1388.3	-72.50	-56.94	-30.00	26.94	15.56	RMS	Horizontal
8	2607.65	-73.89	-57.62	-30.00	27.62	16.27	RMS	Horizontal
9	4807.1	-72.74	-46.59	-30.00	16.59	26.15	RMS	Horizontal
10	6459.85	-77.78	-46.89	-30.00	16.89	30.89	RMS	Horizontal
11	10459.45	-63.92	-53.12	-30.00	23.12	10.80	RMS	Horizontal
12	17245.6	-70.85	-50.20	-30.00	20.20	20.65	RMS	Horizontal

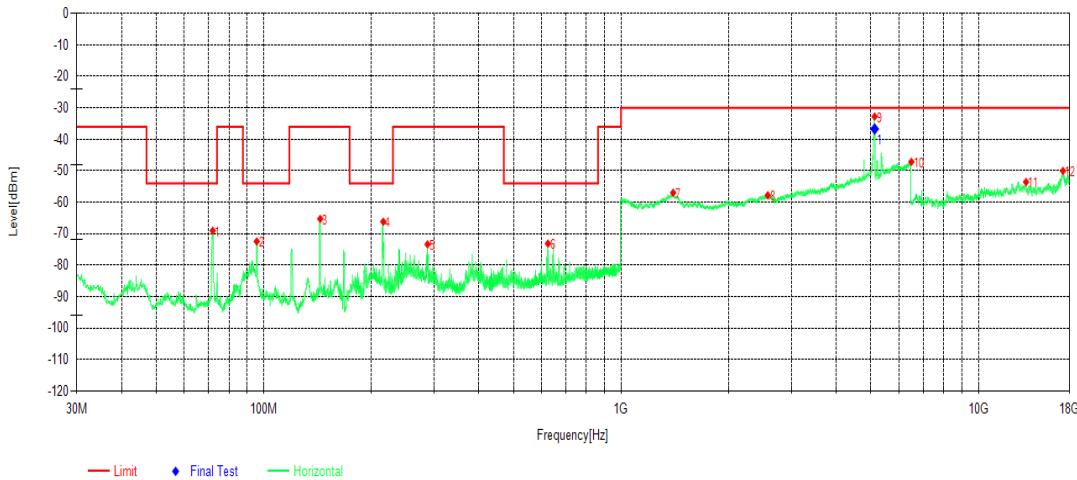
Project No	E20230331478001	EUT:	Hub M3
Model:	HM-G01E	Sample No:	E20230331478001-0004
Mode:	TX 802.11ac VHT40 5230MHz	Voltage:	AC 230V/50Hz
Environment:	23.5°C/42%RH/101.0kPa	Engineer:	Gong Xuan
Test date:	2023-11-21	/	/



Suspected Data List

NO.	Freq. [MHz]	Reading [dBm]	Level [dBm]	Limit [dBm]	Margin [dB]	Factor [dB]	Detector	Polarity
1	46.587	-63.05	-76.66	-36.00	40.66	-13.61	RMS	Vertical
2	72.001	-46.62	-65.30	-54.00	11.30	-18.68	RMS	Vertical
3	95.96	-48.22	-67.53	-54.00	13.53	-19.31	RMS	Vertical
4	143.975	-50.20	-69.49	-36.00	33.49	-19.29	RMS	Vertical
5	216.337	-52.33	-69.85	-54.00	15.85	-17.52	RMS	Vertical
6	913.476	-67.62	-70.94	-36.00	34.94	-3.32	RMS	Vertical
7	1748.55	-64.52	-52.23	-30.00	22.23	12.29	RMS	Vertical
8	2530.65	-73.53	-57.42	-30.00	27.42	16.11	RMS	Vertical
9	4806.55	-74.04	-47.68	-30.00	17.68	26.36	RMS	Vertical
10	6499.45	-78.07	-46.84	-30.00	16.84	31.23	RMS	Vertical
11	10460.6	-61.57	-51.57	-30.00	21.57	10.00	RMS	Vertical
12	17412.35	-70.79	-50.82	-30.00	20.82	19.97	RMS	Vertical

Project No	E20230331478001	EUT:	Hub M3
Model:	HM-G01E	Sample No:	E20230331478001-0004
Mode:	TX 802.11ac VHT80 5210MHz	Voltage:	AC 230V/50Hz
Environment:	23.5°C/42%RH/101.0kPa	Engineer:	Gong Xuan
Test date:	2023-11-21	/	/



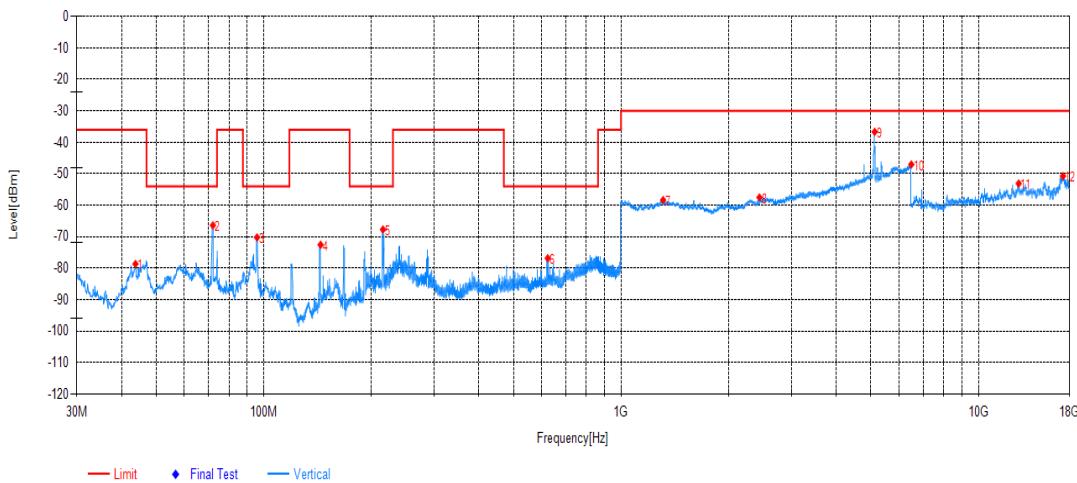
Suspected Data List

NO.	Freq. [MHz]	Reading [dBm]	Level [dBm]	Limit [dBm]	Margin [dB]	Factor [dB]	Detector	Polarity
1	72.001	-47.47	-69.03	-54.00	15.03	-21.56	RMS	Horizontal
2	95.669	-55.55	-72.42	-54.00	18.42	-16.87	RMS	Horizontal
3	143.975	-45.95	-65.28	-36.00	29.28	-19.33	RMS	Horizontal
4	216.046	-48.82	-66.14	-54.00	12.14	-17.32	RMS	Horizontal
5	287.535	-59.19	-73.34	-36.00	37.34	-14.15	RMS	Horizontal
6	624.513	-64.95	-73.11	-54.00	19.11	-8.16	RMS	Horizontal
7	1398.75	-72.79	-56.96	-30.00	26.96	15.83	RMS	Horizontal
8	2573.55	-73.92	-57.75	-30.00	27.75	16.17	RMS	Horizontal
9	5123.9	-60.17	-32.76	-30.00	2.76	27.41	RMS	Horizontal
10	6491.2	-78.19	-47.14	-30.00	17.14	31.05	RMS	Horizontal
11	13597.8	-70.37	-53.53	-30.00	23.53	16.84	RMS	Horizontal
12	17251.35	-70.66	-50.00	-30.00	20.00	20.66	RMS	Horizontal

Final Data List

NO.	Freq. [MHz]	Reading [dBm]	Level [dBm]	Limit [dBm]	Margin [dB]	Factor [dB]	Detector	Polarity
1	5123.9	-64.12	-36.71	-30.00	6.71	27.41	RMS	Horizontal

Project No	E20230331478001	EUT:	Hub M3
Model:	HM-G01E	Sample No:	E20230331478001-0004
Mode:	TX 802.11ac VHT80 5210MHz	Voltage:	AC 230V/50Hz
Environment:	23.5°C/42%RH/101.0kPa	Engineer:	Gong Xuan
Test date:	2023-11-21	/	/



Suspected Data List

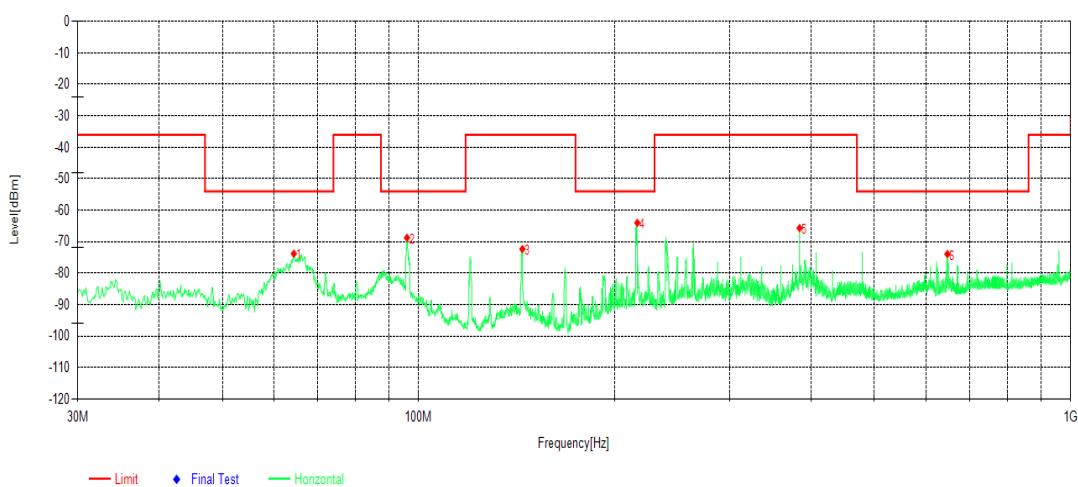
NO.	Freq. [MHz]	Reading [dBm]	Level [dBm]	Limit [dBm]	Margin [dB]	Factor [dB]	Detector	Polarity
1	43.774	-64.84	-78.63	-36.00	42.63	-13.79	RMS	Vertical
2	72.098	-47.64	-66.36	-54.00	12.36	-18.72	RMS	Vertical
3	95.863	-50.89	-70.21	-54.00	16.21	-19.32	RMS	Vertical
4	144.266	-53.29	-72.55	-36.00	36.55	-19.26	RMS	Vertical
5	215.658	-50.16	-67.68	-54.00	13.68	-17.52	RMS	Vertical
6	623.64	-68.73	-76.82	-54.00	22.82	-8.09	RMS	Vertical
7	1310.75	-72.10	-58.35	-30.00	28.35	13.75	RMS	Vertical
8	2441	-73.14	-57.51	-30.00	27.51	15.63	RMS	Vertical
9	5124.45	-64.31	-36.65	-30.00	6.65	27.66	RMS	Vertical
10	6492.3	-78.19	-47.01	-30.00	17.01	31.18	RMS	Vertical
11	12960.7	-69.28	-53.08	-30.00	23.08	16.20	RMS	Vertical
12	17249.05	-70.77	-50.71	-30.00	20.71	20.06	RMS	Vertical

30MHz-1GHz

Power supply: AC 230V/50Hz(DC 48V/0.27A power by PoE Adapter)

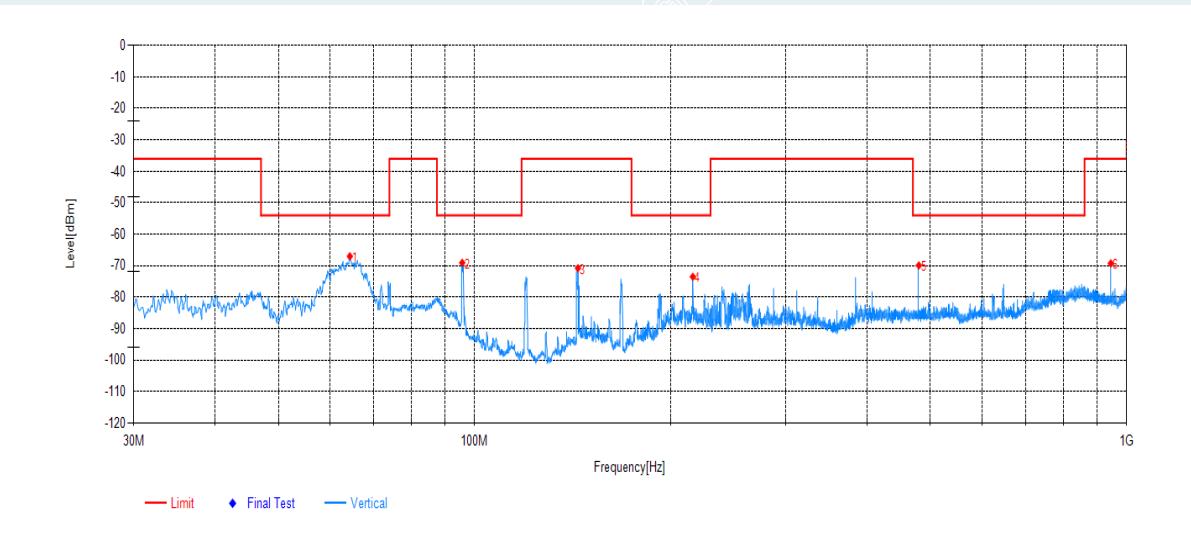
Pre-scan all modes and recorded the worst case results(TX 802.11a 5180MHz) in this report.

Project No	E20230331478001	EUT:	Hub M3
Model:	HM-G01E	Sample No:	E20230331478001-0004
Mode:	TX 802.11a 5180MHz	Voltage:	AC 230V/50Hz
Environment:	24.6°C/49%RH/101.0kPa	Engineer:	Gong Xuan
Test date:	2023-11-24	/	/

**Suspected Data List**

NO.	Freq. [MHz]	Reading [dBm]	Level [dBm]	Limit [dBm]	Margin [dB]	Factor [dB]	Detector	Polarity
1	64.338	-54.33	-73.77	-54.00	19.77	-19.44	RMS	Horizontal
2	95.96	-51.89	-68.75	-54.00	14.75	-16.86	RMS	Horizontal
3	144.266	-52.92	-72.31	-36.00	36.31	-19.39	RMS	Horizontal
4	216.434	-46.67	-63.98	-54.00	9.98	-17.31	RMS	Horizontal
5	383.953	-53.74	-65.67	-36.00	29.67	-11.93	RMS	Horizontal
6	647.114	-66.20	-73.89	-54.00	19.89	-7.69	RMS	Horizontal

Project No	E20230331478001	EUT:	Hub M3
Model:	HM-G01E	Sample No:	E20230331478001-0004
Mode:	TX 802.11a 5180MHz	Voltage:	AC 230V/50Hz
Environment:	24.6°C/49%RH/101.0kPa	Engineer:	Gong Xuan
Test date:	2023-11-24	/	/



Suspected Data List

NO.	Freq. [MHz]	Reading [dBm]	Level [dBm]	Limit [dBm]	Margin [dB]	Factor [dB]	Detector	Polarity
1	64.338	-52.12	-66.98	-54.00	12.98	-14.86	RMS	Vertical
2	95.669	-49.76	-69.08	-54.00	15.08	-19.32	RMS	Vertical
3	143.975	-51.48	-70.77	-36.00	34.77	-19.29	RMS	Vertical
4	216.046	-55.96	-73.48	-54.00	19.48	-17.52	RMS	Vertical
5	479.983	-58.60	-69.88	-54.00	15.88	-11.28	RMS	Vertical
6	945.68	-66.43	-69.22	-36.00	33.22	-2.79	RMS	Vertical

18GHz~26.5GHz

Pre-scan all modes, the worst power supply is AC 230/50Hz(DC 5V/2A power by Adapter). In the worst power supply mode, recorded the worst case(IEEE 802.11a) results in this report.

Project No	E20230331478001	EUT:	Hub M3
Model:	HM-G01E	Sample No:	E20230331478001-0004
Mode:	TX 802.11a 5180MHz	Voltage:	AC 230V/50Hz
Environment:	24.8°C/42%RH/101.0kPa	Engineer:	Gong Xuan
Test date:	2023-11-22	/	/

Suspected Data List

NO.	Freq. [MHz]	Reading [dBm]	Level [dBm]	Limit [dBm]	Margin [dB]	Factor [dB]	Detector	Polarity
1	18325.55	-68.74	-71.04	-30.00	41.04	-2.30	RMS	Horizontal
2	19694.9	-69.51	-70.95	-30.00	40.95	-1.44	RMS	Horizontal
3	21270.8	-71.45	-69.69	-30.00	39.69	1.76	RMS	Horizontal
4	23525	-72.90	-69.14	-30.00	39.14	3.76	RMS	Horizontal
5	25268.35	-73.01	-68.84	-30.00	38.84	4.17	RMS	Horizontal
6	26268.8	-72.62	-67.80	-30.00	37.80	4.82	RMS	Horizontal

Suspected Data List

NO.	Freq. [MHz]	Reading [dBm]	Level [dBm]	Limit [dBm]	Margin [dB]	Factor [dB]	Detector	Polarity
1	18380.8	-68.47	-71.14	-30.00	41.14	-2.67	RMS	Vertical
2	19467.1	-70.04	-71.02	-30.00	41.02	-0.98	RMS	Vertical
3	21249.55	-71.76	-70.25	-30.00	40.25	1.51	RMS	Vertical
4	23513.95	-73.15	-69.40	-30.00	39.40	3.75	RMS	Vertical
5	24688.65	-72.79	-68.23	-30.00	38.23	4.56	RMS	Vertical
6	26270.5	-72.63	-67.98	-30.00	37.98	4.65	RMS	Vertical

Project No	E20230331478001	EUT:	Hub M3
Model:	HM-G01E	Sample No:	E20230331478001-0004
Mode:	TX 802.11a 5240MHz	Voltage:	AC 230V/50Hz
Environment:	24.8°C/42%RH/101.0kPa	Engineer:	Gong Xuan
Test date:	2023-11-22	/	/

Suspected Data List

NO.	Freq. [MHz]	Reading [dBm]	Level [dBm]	Limit [dBm]	Margin [dB]	Factor [dB]	Detector	Polarity
1	18386.75	-68.83	-71.36	-30.00	41.36	-2.53	RMS	Horizontal
2	19394	-69.89	-70.83	-30.00	40.83	-0.94	RMS	Horizontal
3	21860.7	-71.45	-69.68	-30.00	39.68	1.77	RMS	Horizontal
4	23492.7	-73.31	-69.47	-30.00	39.47	3.84	RMS	Horizontal
5	24706.5	-73.15	-68.46	-30.00	38.46	4.69	RMS	Horizontal
6	26222.9	-72.97	-68.11	-30.00	38.11	4.86	RMS	Horizontal

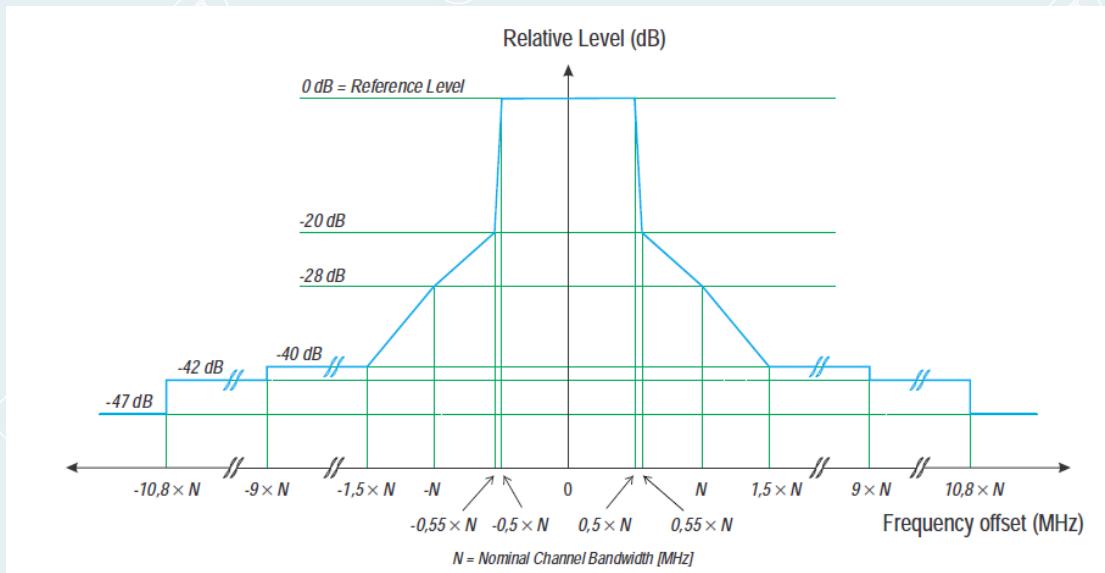
Suspected Data List

NO.	Freq. [MHz]	Reading [dBm]	Level [dBm]	Limit [dBm]	Margin [dB]	Factor [dB]	Detector	Polarity
1	18289.85	-68.73	-71.07	-30.00	41.07	-2.34	RMS	Vertical
2	19999.2	-70.27	-70.98	-30.00	40.98	-0.71	RMS	Vertical
3	21846.25	-71.15	-69.55	-30.00	39.55	1.60	RMS	Vertical
4	23495.25	-73.14	-69.33	-30.00	39.33	3.81	RMS	Vertical
5	24746.45	-73.33	-68.46	-30.00	38.46	4.87	RMS	Vertical
6	26257.75	-72.69	-68.03	-30.00	38.03	4.66	RMS	Vertical

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4.6 TRANSMITTER UNWANTED EMISSIONS WITHIN 5GHZ BANDS

4.6.1 LIMITS



4.6.2 TEST PROCEDURE

Test requirement: ETSI EN 301 893 clause 4.2.4.2

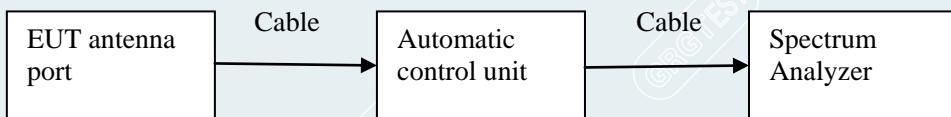
Test Method: ETSI EN 301 893 clause 5.4.6.2

EUT Operation: Keep EUT on transmitting mode by the software provided by manufacturer.

Pretest the EUT at different transmission rate and report show the worst case data.

Test condition: These measurements shall be performed under normal test conditions (see clause 5.1.2).

4.6.3 TEST SETUP



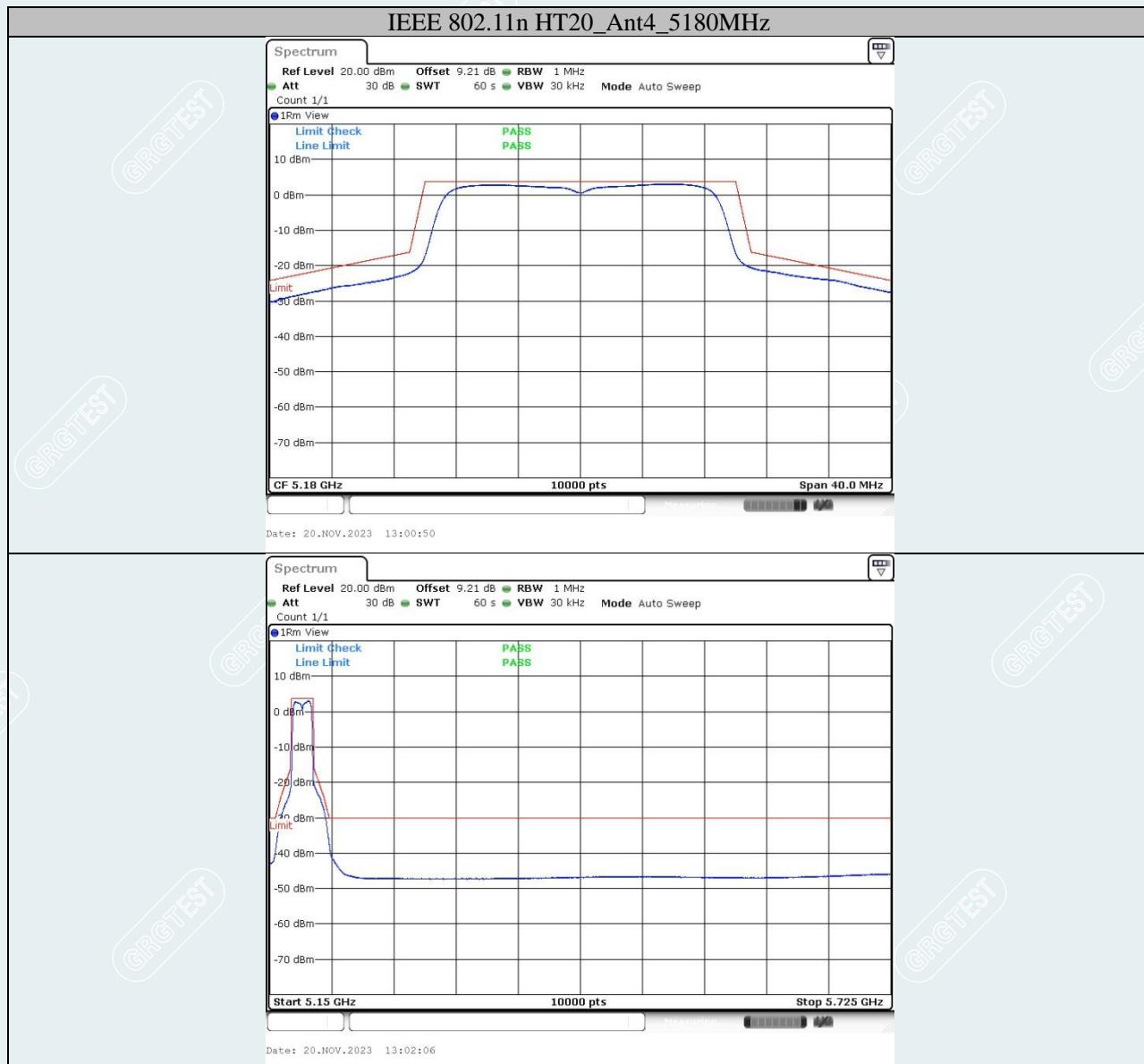
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4.6.4 TEST RESULTS

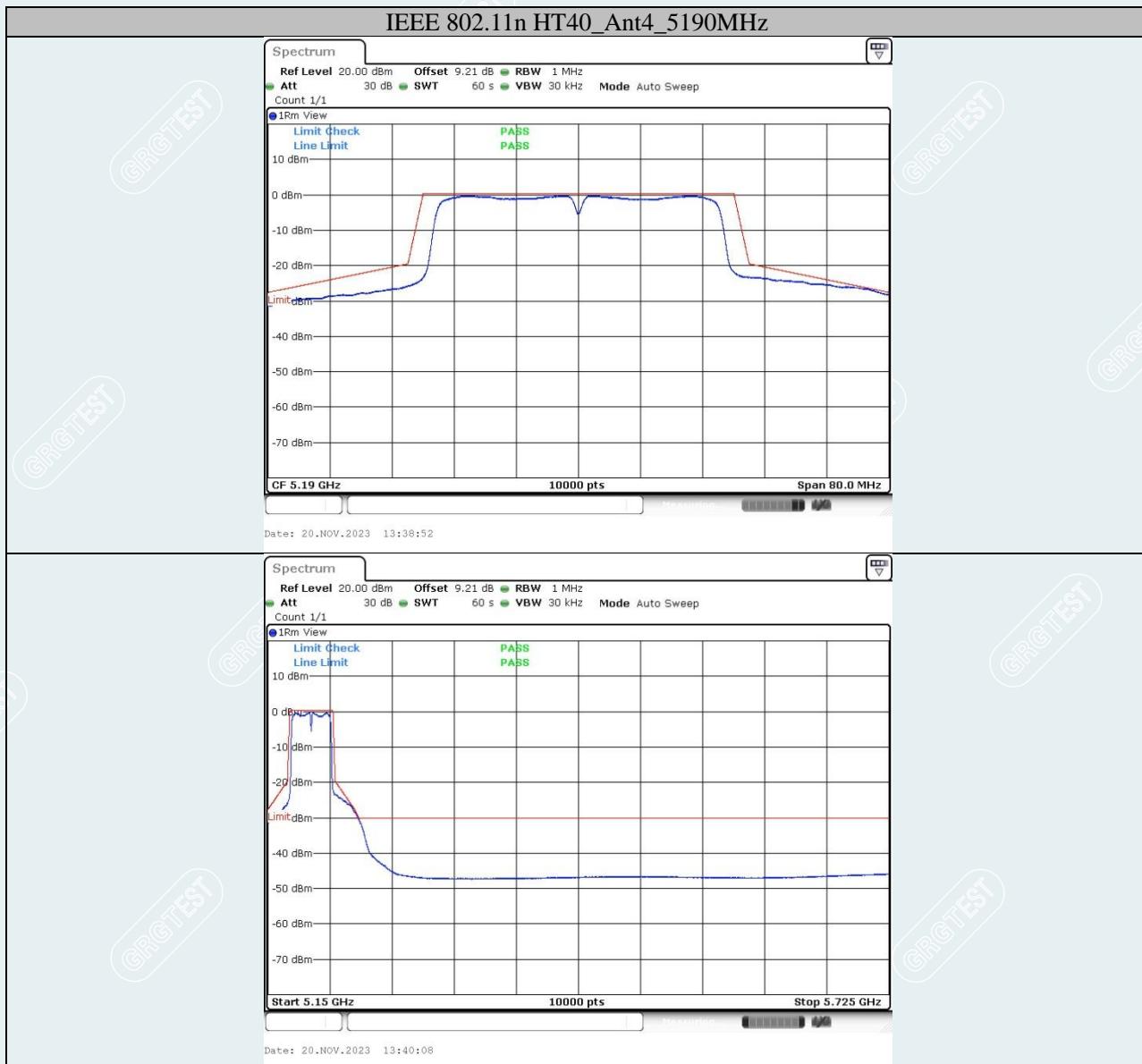
Test environment: Normal condition: 25.4 °C 45 %RH/101.0kPa
Test Engineer: Huang Tianmei
Test Date: 2023-11-20
Test Voltage: DC 5V























4.7 ADAPTIVITY

4.7.1 DEFINITION

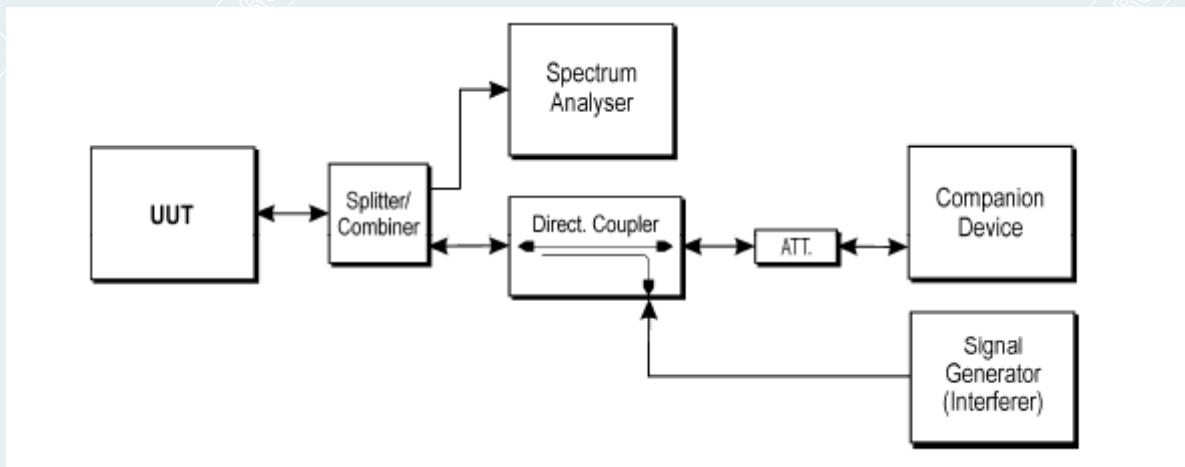
Adaptivity (Channel Access Mechanism) is an automatic mechanism by which a device limits its transmissions and gains access to an Operating Channel.

Adaptivity is not intended to be used as an alternative to DFS to detect radar transmissions, but to detect transmissions from other RLAN devices operating in the band.

4.7.2 TEST PROCEDURE

Test requirement:	ETSI EN 301893 clause 4.2.7
Test Method:	ETSI EN 301893 clause 5.4.9.3
EUT Operation:	Keep EUT on working normal mode.
Test condition:	These measurements shall be performed under normal test conditions (see clause 5.1.2).
Test item:	Clause 5.4.9.3.2.3

4.7.3 TEST SETUP



4.7.4 TEST RESULTS

Test environment: Normal condition: 24.5°C/53%RH/101.0kPa

Test Engineer: Huang Tianmei

Test Date: 2023-12-04

Test Voltage: DC 5V

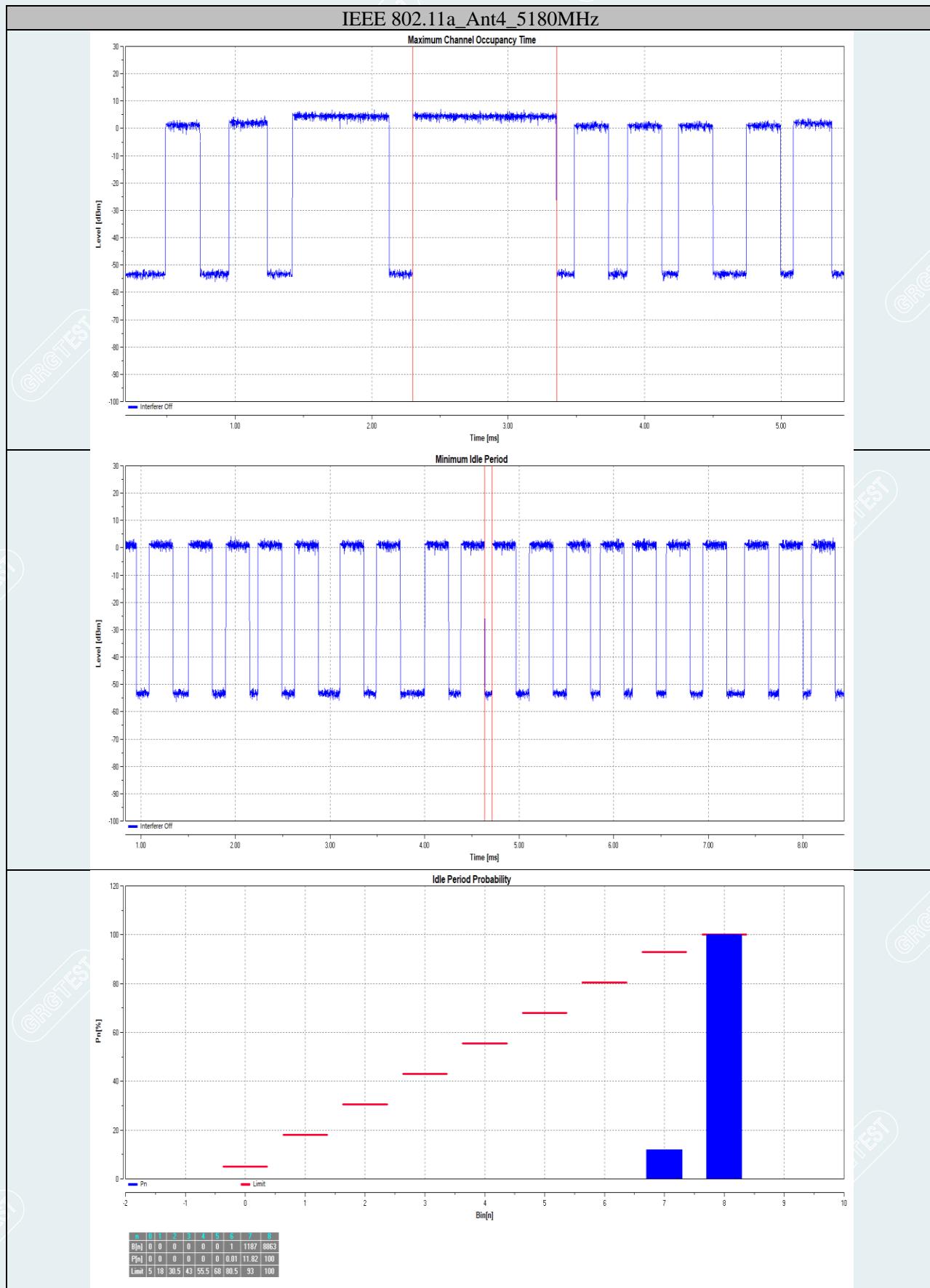
Test Mode	Antenna	Frequency [MHz]	Max.COT [ms]	Limit [ms]	Min.Idle Time[ms]	Limit [ms]	Verdict
IEEE 802.11a	Ant4	5180	1.053	2.000	0.076	0.027	PASS
IEEE 802.11n HT40	Ant4	5190	3.477	4.000	0.066	0.027	PASS

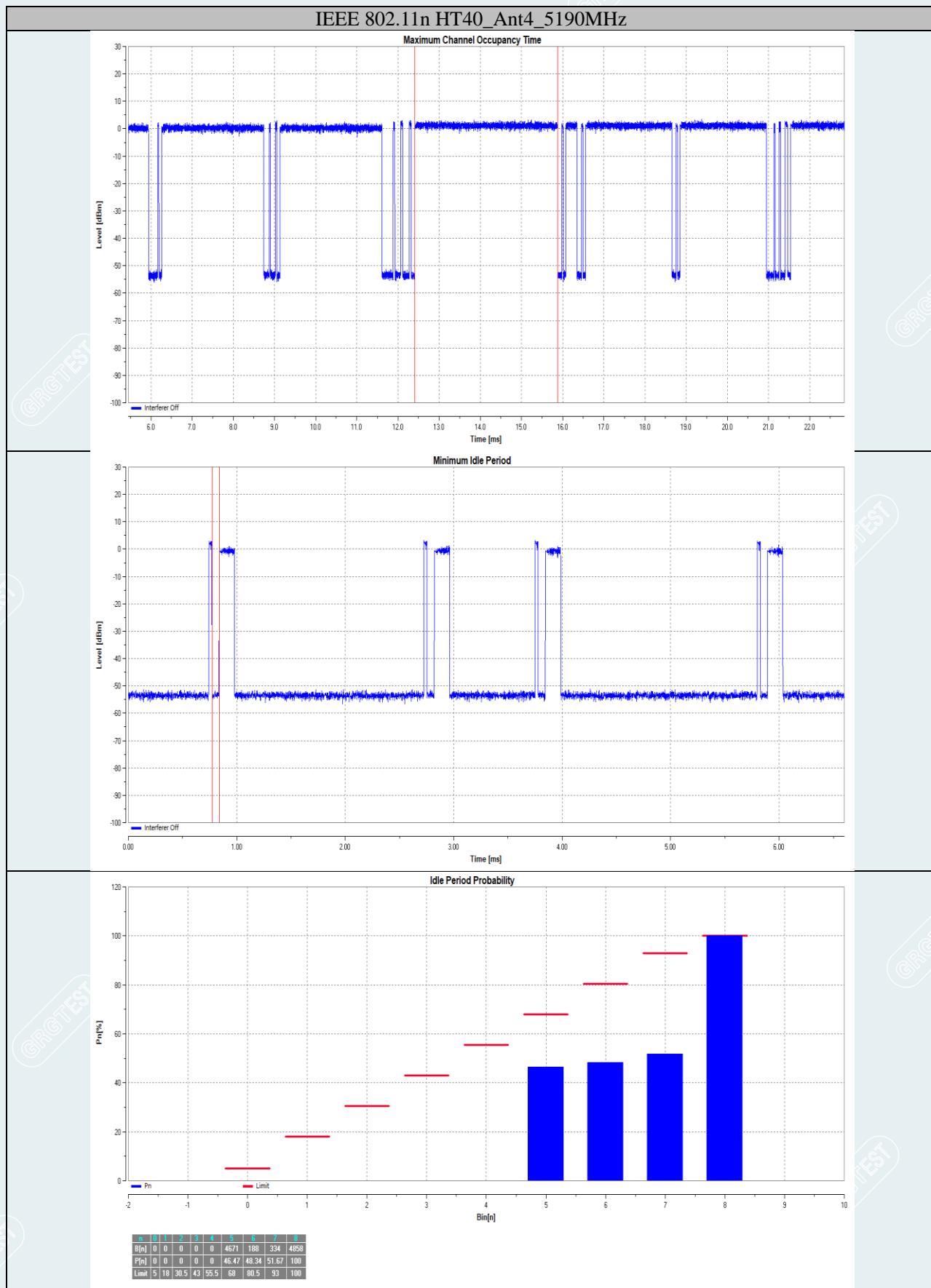
Test Mode	Antenna	Frequency [MHz]	Interference Type	Add interference Time [ms]	Interference Level [dBm/MHz]	Max. Short Control number [n]	Limit [n]	Max. Short Control Time [ms]	Limit [ms]	Verdict
IEEE 802.11a	Ant4	5180	AWGN	2101	-74.50	1	50	0.60	2.5	PASS
			OFDM	2101	-74.50	2	50	1.30	2.5	PASS
			LTE	2101	-74.50	1	50	0.60	2.5	PASS
IEEE 802.11n HT40	Ant4	5190	AWGN	2101	-74.50	0	50	0.00	2.5	PASS

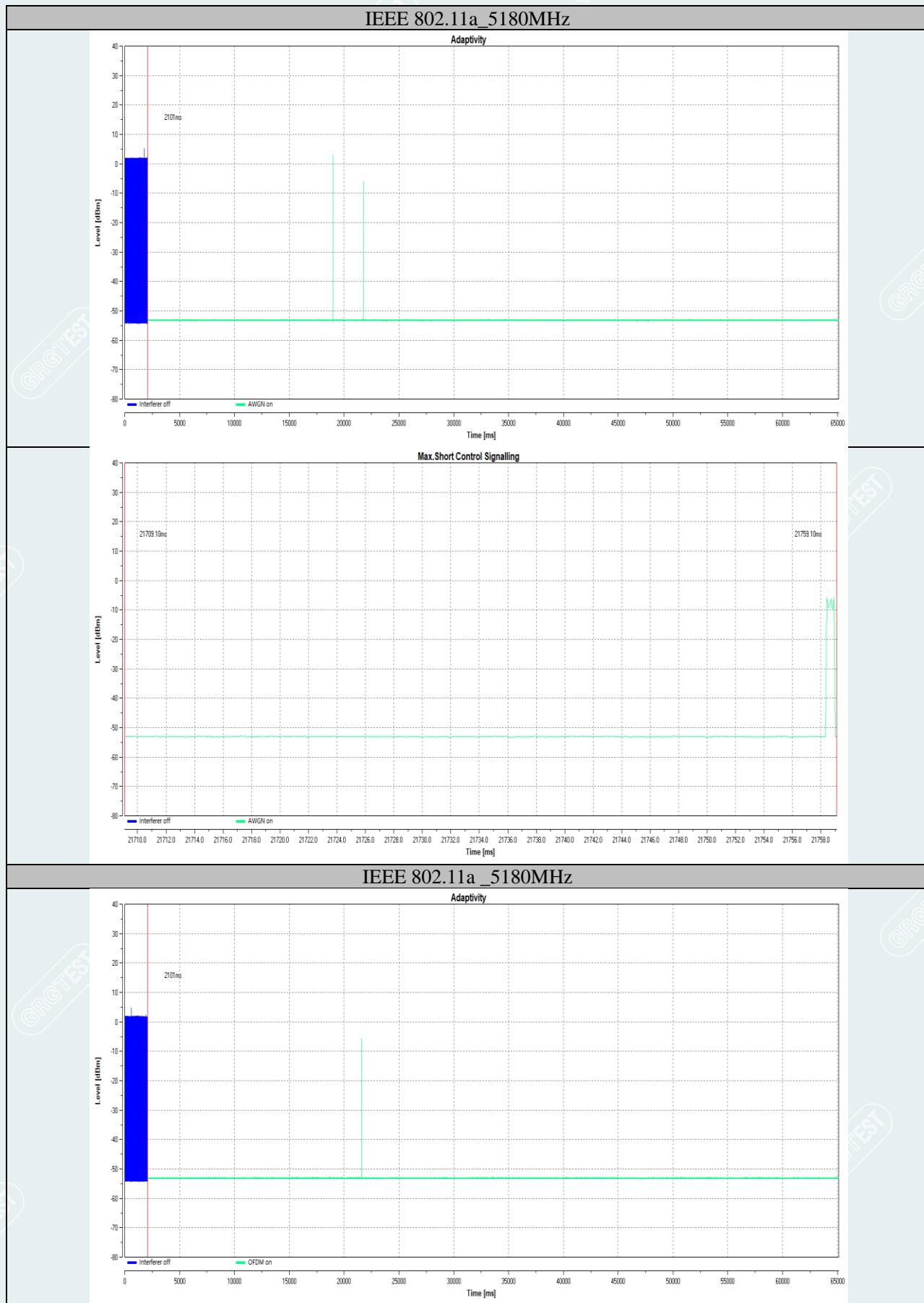
Remark:

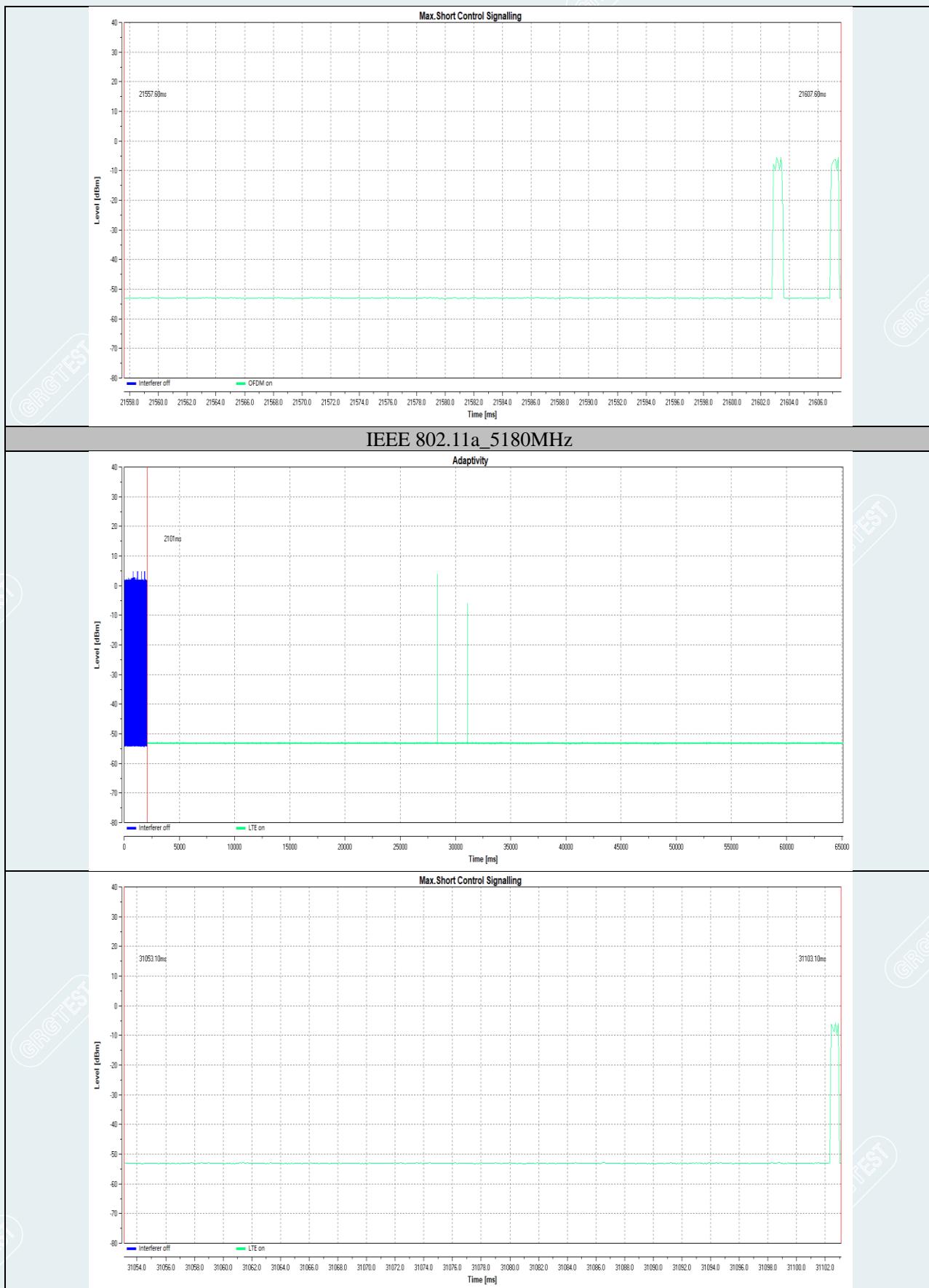
1. Interference level = -75 dBm/MHz + 0.5 dB_i gain

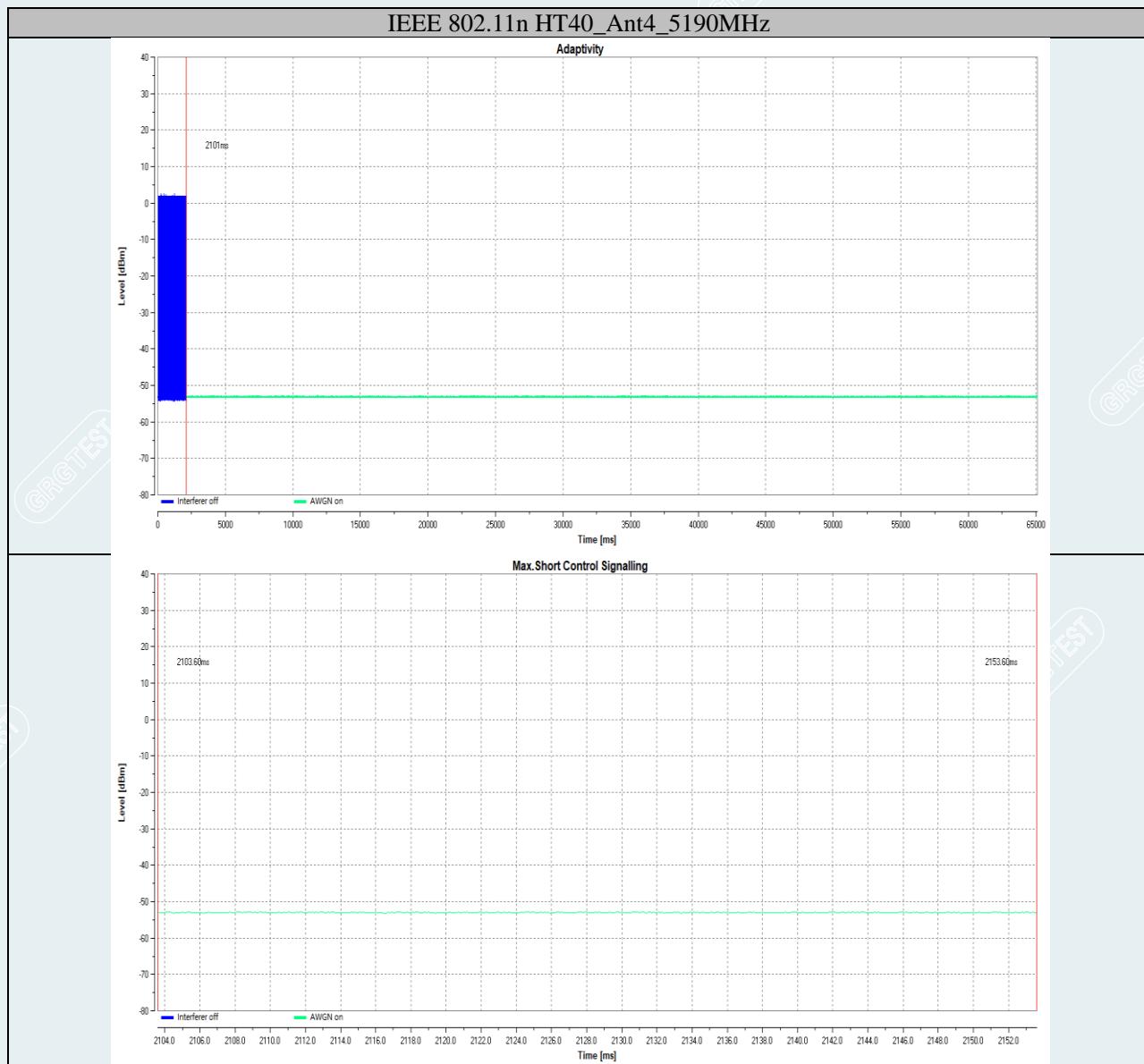
2. within an observation period of 50 ms, the number of Short Control Signalling Transmissions by the equipment shall be equal to or less than 50; and the total duration of the equipment's Short Control Signalling Transmissions shall be less than 2500 μs within said observation period.











5. RECEIVER REQUIREMENTS

5.1 RECEIVER SPURIOUS EMISSIONS

5.1.1 LIMITS

Frequency range	Limit
30 MHz to 1 GHz	-57 dBm
1 GHz to 26.5 GHz	-47 dBm

5.1.2 TEST PROCEDURE

Test requirement: ETSI EN 301 893 clause 4.2.5

Test Method: ETSI EN 301 893 clause 5.4.7.2.1 and annex B

EUT Operation: Keep EUT on receiver mode by the software provided by manufacturer.

Test condition: Mode 2

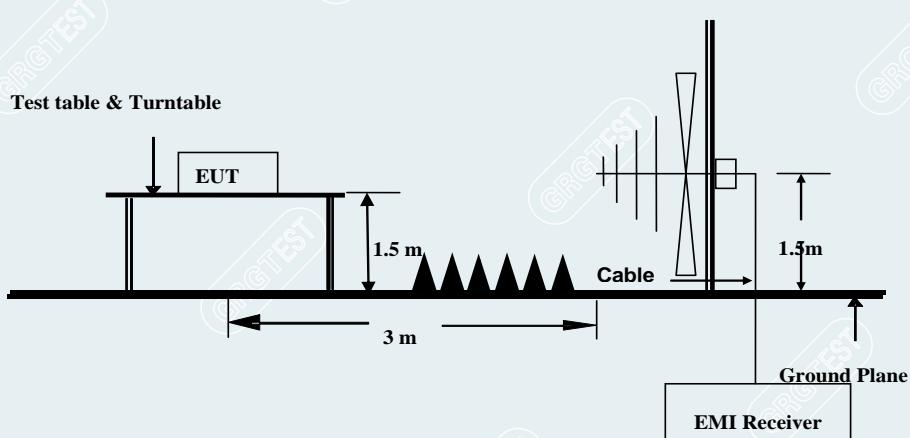
Test method: ETSI EN 301 893 clause 5.4.7.2.2

Note: /

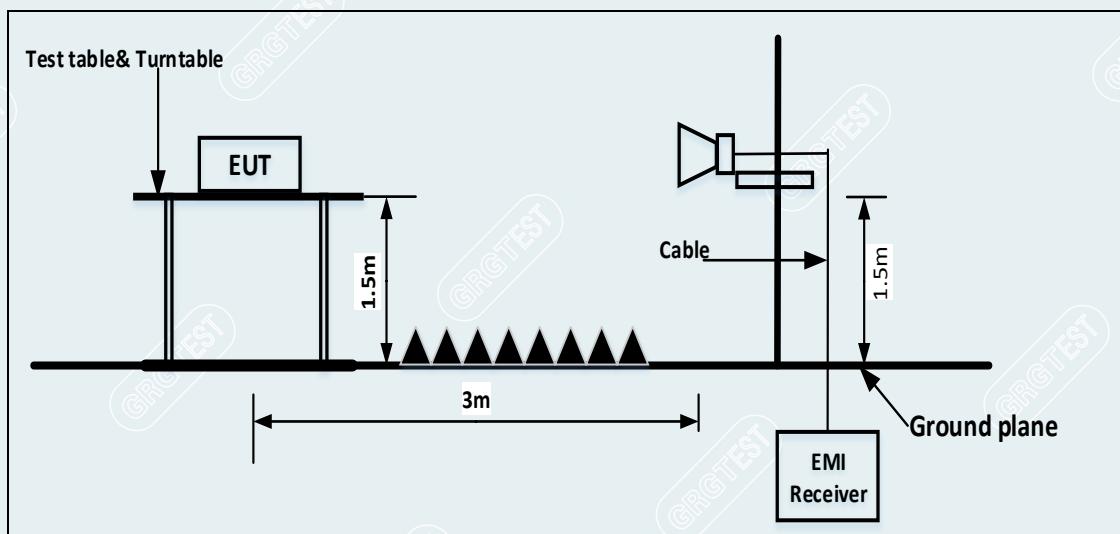
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5.1.3 TEST SETUP

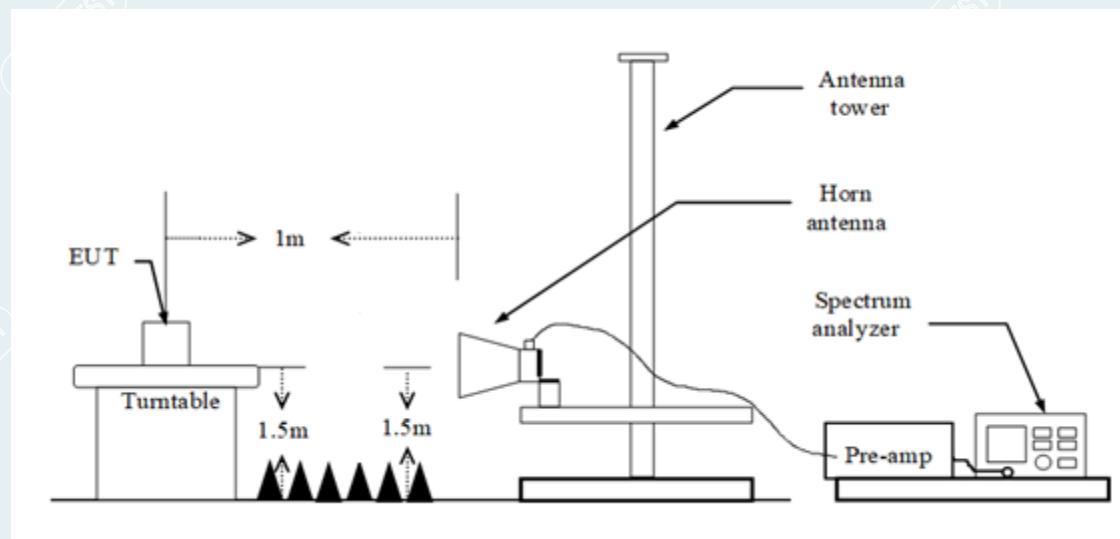
Below 1GHz



1GHz -18GHz



Above 18GHz



5.1.4 DATA SAMPLE

Freq. [MHz]	Reading [dBm]	Level [dBm]	Limit [dBm]	Margin [dB]	Factor [dB]	Detector	Polarity
XXX	-58.02	-73.33	-57.00	16.33	-15.31	RMS	Horizontal

Frequency (MHz) = Emission frequency in MHz

Reading (dBm) = Uncorrected Analyzer / Receiver reading

Level (dBm) = Reading (dBm) + Factor (dB)

Limit (dBm) = Limit stated in standard

Margin (dB) = Limit (dBm) – Level (dBm)

RMS = Root Mean Square

----- The following blanks -----

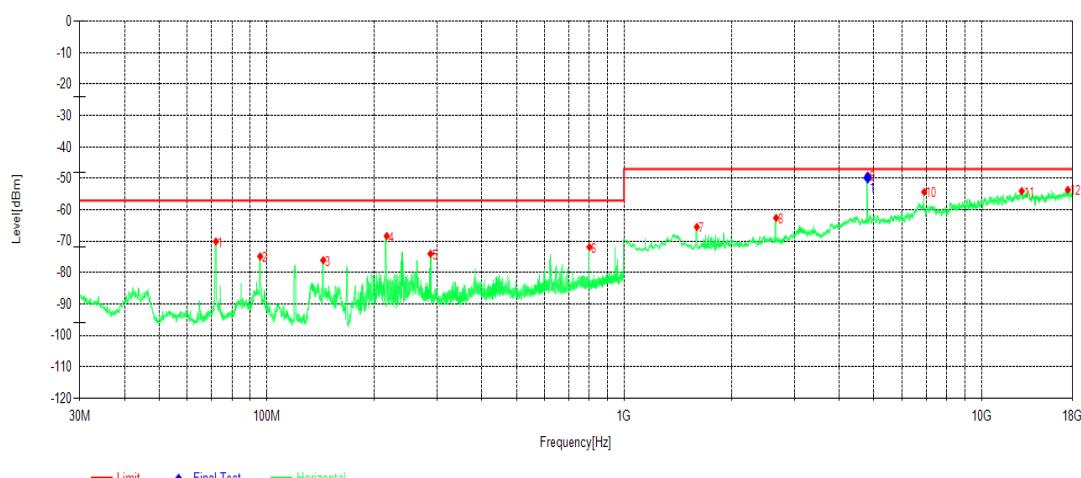
5.1.5 TEST RESULTS

30MHz-18GHz

Note: Pre-scan all modes, the worst power supply is AC 230/50Hz(DC 5V/2A power by Adapter). In the worst power supply mode, recorded the worst case results(RX 802.11n HT40 5190MHz) in this report.

Power supply: AC 230V/50Hz (DC 5V/2A power by Adapter)

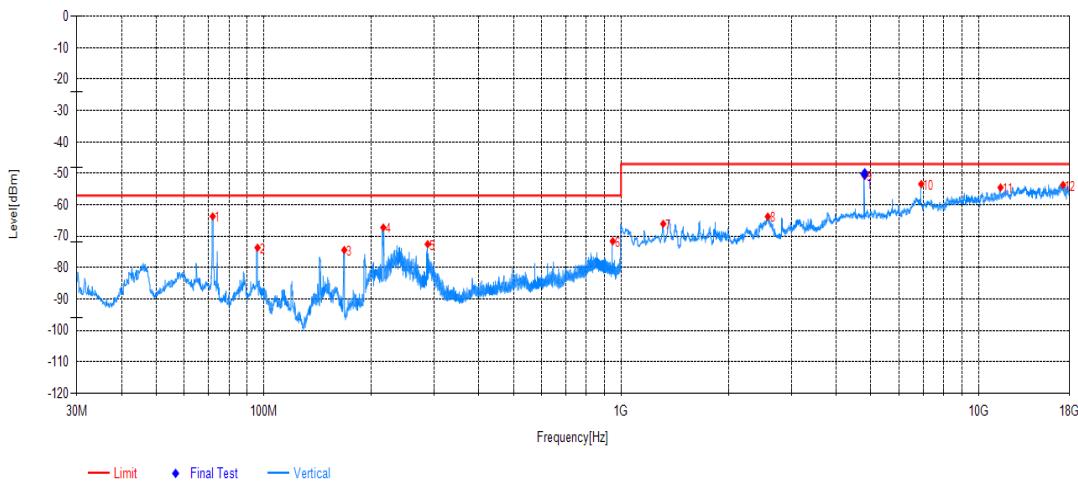
Project No	E20230331478001	EUT:	Hub M3
Model:	HM-G01E	Sample No:	E20230331478001-0004
Mode:	RX 802.11n HT40 5190MHz	Voltage:	AC 230V/50Hz
Environment:	23.8°C/42%RH/101.0kPa	Engineer:	Gong Xuan
Test date:	2023-11-22	/	/



Suspected Data List								
NO.	Freq. [MHz]	Reading [dBm]	Level [dBm]	Limit [dBm]	Margin [dB]	Factor [dB]	Detector	Polarity
1	72.098	-48.49	-70.08	-57.00	13.08	-21.59	RMS	Horizontal
2	95.96	-57.95	-74.81	-57.00	17.81	-16.86	RMS	Horizontal
3	143.975	-56.72	-76.05	-57.00	19.05	-19.33	RMS	Horizontal
4	216.725	-51.01	-68.31	-57.00	11.31	-17.30	RMS	Horizontal
5	287.535	-59.85	-74.00	-57.00	17.00	-14.15	RMS	Horizontal
6	799.986	-66.37	-71.84	-57.00	14.84	-5.47	RMS	Horizontal
7	1598.4	-52.44	-65.43	-47.00	18.43	-12.99	RMS	Horizontal
8	2664.3	-52.61	-62.58	-47.00	15.58	-9.97	RMS	Horizontal
9	4806.3	-47.09	-49.04	-47.00	2.04	-1.95	RMS	Horizontal
10	6919.4	-59.51	-54.30	-47.00	7.30	5.21	RMS	Horizontal
11	12964.6	-69.93	-54.01	-47.00	7.01	15.92	RMS	Horizontal
12	17457.7	-72.20	-53.63	-47.00	6.63	18.57	RMS	Horizontal

Final Data List								
NO.	Freq. [MHz]	Reading [dBm]	Level [dBm]	Limit [dBm]	Margin [dB]	Factor [dB]	Detector	Polarity
1	4806.3	-47.86	-49.81	-47.00	2.81	-1.95	RMS	Horizontal

Project No	E20230331478001	EUT:	Hub M3
Model:	HM-G01E	Sample No:	E20230331478001-0004
Mode:	RX 802.11n HT40 5190MHz	Voltage:	AC 230V/50Hz
Environment:	23.8°C/42%RH/101.0kPa	Engineer:	Gong Xuan
Test date:	2023-11-22	/	/



Suspected Data List

NO.	Freq. [MHz]	Reading [dBm]	Level [dBm]	Limit [dBm]	Margin [dB]	Factor [dB]	Detector	Polarity
1	72.001	-44.98	-63.66	-57.00	6.66	-18.68	RMS	Vertical
2	96.154	-54.32	-73.62	-57.00	16.62	-19.30	RMS	Vertical
3	168.128	-56.50	-74.37	-57.00	17.37	-17.87	RMS	Vertical
4	216.24	-49.70	-67.22	-57.00	10.22	-17.52	RMS	Vertical
5	287.729	-57.97	-72.52	-57.00	15.52	-14.55	RMS	Vertical
6	947.62	-68.66	-71.55	-57.00	14.55	-2.89	RMS	Vertical
7	1312.8	-54.32	-66.04	-47.00	19.04	-11.72	RMS	Vertical
8	2574.2	-53.94	-63.73	-47.00	16.73	-9.79	RMS	Vertical
9	4806.3	-49.08	-50.81	-47.00	3.81	-1.73	RMS	Vertical
10	6919.4	-58.83	-53.42	-47.00	6.42	5.41	RMS	Vertical
11	11533.2	-68.36	-54.47	-47.00	7.47	13.89	RMS	Vertical
12	17255.4	-70.70	-53.64	-47.00	6.64	17.06	RMS	Vertical

Final Data List

NO.	Freq. [MHz]	Reading [dBm]	Level [dBm]	Limit [dBm]	Margin [dB]	Factor [dB]	Detector	Polarity
1	4806.3	-48.39	-50.12	-47.00	3.12	-1.73	RMS	Vertical

18GHz-26.5GHz

Pre-scan all modes, the worst power supply is AC 230/50Hz(DC 5V/2A power by Adapter) . In the worst power supply mode, recorded the worst case results (IEEE 802.11n HT40 5190MHz) in this report.

Project No	E20230331478001	EUT:	Hub M3
Model:	HM-G01E	Sample No:	E20230331478001-0004
Mode:	RX 802.11n HT40 5190MHz	Voltage:	AC 230V/50Hz
Environment:	23.8°C/42%RH/101.0kPa	Engineer:	Gong Xuan
Test date:	2023-11-22	/	/

Suspected Data List

NO.	Freq. [MHz]	Reading [dBm]	Level [dBm]	Limit [dBm]	Margin [dB]	Factor [dB]	Detector	Polarity
1	18391	-67.38	-69.92	-47.00	22.92	-2.54	RMS	Horizontal
2	20618.85	-69.74	-69.26	-47.00	22.26	0.48	RMS	Horizontal
3	21937.2	-67.35	-65.58	-47.00	18.58	1.77	RMS	Horizontal
4	23502.05	-69.83	-65.97	-47.00	18.97	3.86	RMS	Horizontal
5	24704.8	-70.72	-66.03	-47.00	19.03	4.69	RMS	Horizontal
6	25906.7	-71.18	-66.26	-47.00	19.26	4.92	RMS	Horizontal

Suspected Data List

NO.	Freq. [MHz]	Reading [dBm]	Level [dBm]	Limit [dBm]	Margin [dB]	Factor [dB]	Detector	Polarity
1	18386.75	-67.65	-70.34	-47.00	23.34	-2.69	RMS	Vertical
2	20008.55	-68.83	-69.52	-47.00	22.52	-0.69	RMS	Vertical
3	21843.7	-67.81	-66.21	-47.00	19.21	1.60	RMS	Vertical
4	23512.25	-69.80	-66.04	-47.00	19.04	3.76	RMS	Vertical
5	24735.4	-70.72	-65.91	-47.00	18.91	4.81	RMS	Vertical
6	25922	-71.52	-67.03	-47.00	20.03	4.49	RMS	Vertical

----- The following blanks -----

5.2 RECEIVER BLOCKING

5.2.1 LIMITS

Table 9: Receiver Blocking parameters

Wanted signal mean power from companion device (dBm)	Blocking signal frequency (MHz)	Blocking signal power (dBm) (see note 2)		Type of blocking signal
		Master or Slave with radar detection (see table D.2, note 2)	Slave without radar detection (see table D.2, note 2)	
P _{min} + 6 dB	5 100	-53	-59	Continuous Wave
P _{min} + 6 dB	4 900 5 000 5 975	-47	-53	Continuous Wave
NOTE 1: P _{min} is the minimum level of the wanted signal (in dBm) required to meet the minimum performance criteria as defined clause 4.2.8.3 in the absence of any blocking signal. NOTE 2: The levels specified are levels in front of the UUT antenna. In case of conducted measurements, the same levels should be used at the antenna connector irrespective of antenna gain.				

5.2.2 TEST PROCEDURE

Test requirement: ETSI EN 301893 clause 4.2.8

Test Method: ETSI EN 301893 clause 5.2.10.2

EUT Operation: Keep EUT on receiving mode.

Test condition: These measurements shall be performed under normal test conditions (see clause 5.1.2).

Note: N/A

5.2.3 TEST SETUP

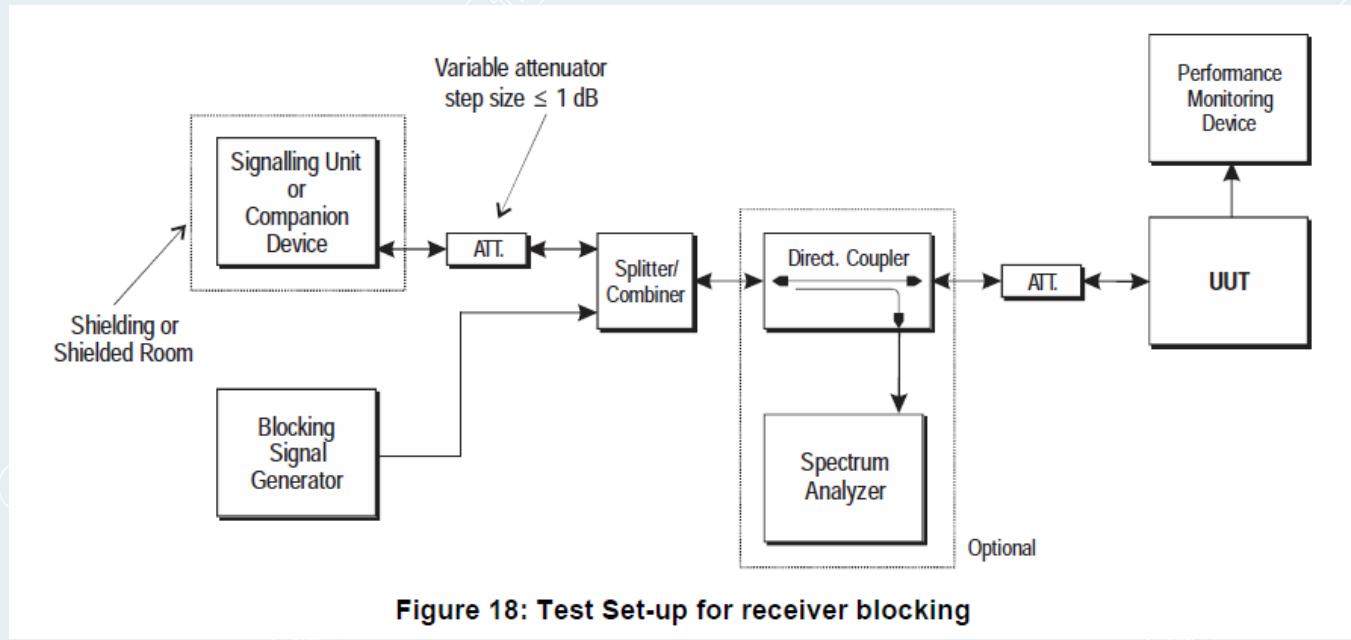


Figure 18: Test Set-up for receiver blocking

5.2.4 TEST RESULTS

Test environment: Normal condition:
25.4°C 45%RH/101.0kPa

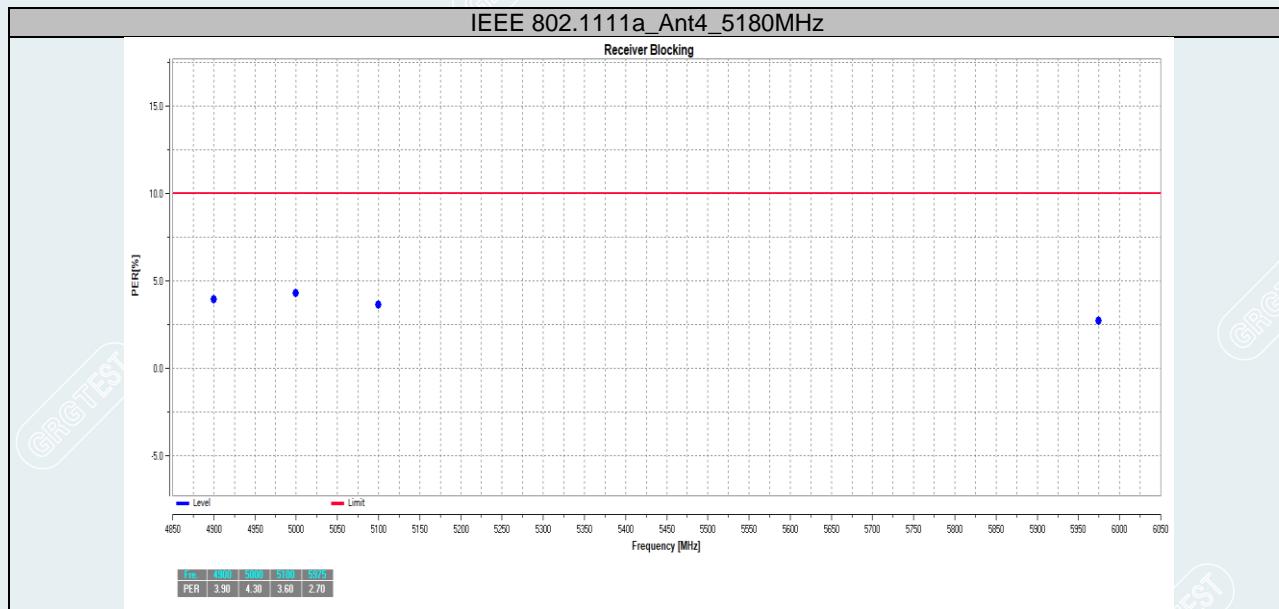
Test Engineer: Huang Tianmei

Test Date: 2023-11-20

Test Voltage: DC 5V

Test Mode	Antenna	Frequency [MHz]	Pmin [dBm]	Wanted signal [dBm]	Frequency [MHz]	CW [dBm]	PER [%]	Limit [%]	Verdict
IEEE 802.11a	Ant4	5180	-87.02	-81.02	4900	-53	3.90	≤ 10	PASS
			-87.02	-81.02	5000	-53	4.30	≤ 10	PASS
			-87.02	-81.02	5100	-59	3.60	≤ 10	PASS
			-87.02	-81.02	5975	-53	2.70	≤ 10	PASS

Test Graphs



----- The following blanks -----

APPENDIX A: PHOTOGRAPH OF THE TEST ARRANGEMENT

Please refer to the attached document E20230331478001-28 CE-Test Photo.

APPENDIX B: PHOTOGRAPH OF THE EUT

Please refer to the attached document E20230331478001-29 EUT photo.

----- End of Report -----